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NINTH ARIZONA TOWN HALL ON HIGHER EDUCATION IN ARIZONA.
RESEARCH REPORT, RECOMMENDATIONS AND LIST OF PARTICIPANTS.
ARIZONA ACADEMY, PHOENIX
ARIZONA UNIV., TUCSON

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THE ARIZONA ACADEMY CHOSE FOR THE TOPIC OF ITS NINTH ARIZONA TOWN HALL THE BROAD PROBLEMS OF HIGHER EDUCATION IN ARIZONA. A GENERAL HISTORY OF HIGHER EDUCATION IN THE UNITED STATES AND A CORRESPONDING HISTORY FOR THE STATE OF ARIZONA IS GIVEN. THE HISTORY OF HIGHER EDUCATION IN ARIZONA GIVES A BRIEF SUMMARY OF PERTINENT DATA ABOUT EACH INSTITUTION IN ARIZONA AND A DISCUSSION OF THE STRUCTURE, PROGRAMS AND PURPOSES OF HIGHER EDUCATION IN ARIZONA. MORE SPECIFIC PROBLEMS DISCUSSED ARE--(1) GROWTH AND RESOURCES OF HIGHER EDUCATION IN ARIZONA--POPULATION GROWTH, IN/OUT-MIGRATION, ENROLLMENTS, JUNIOR COLLEGES, FTE, FACILITIES UTILIZATION, (2) FINANCING OF HIGHER EDUCATION IN ARIZONA, (3) BUDGETS, FUNDS, INSTITUTIONAL COSTS, CAPITAL OUTLAY COSTS, TAX SUPPORT, (4) FEDERAL FUNDS FOR RESEARCH, AND (5) FUTURE DIRECTIONS--ENROLLMENT PROJECTIONS, DOCTORAL DEGREES, PROJECTED COSTS, PROJECTED CAPITAL OUTLAY, CHANGING NEEDS, ROLES, PROGRAMS AND METHODS, ARTICULATION AND COORDINATION, NEW INSTITUTIONS. (HH)

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NINTH ARIZONA TOWN HALL
ON
HIGHER EDUCATION IN ARIZONA

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RESEARCH REPORT
PREPARED BY
THE STATE UNIVERSITIES
OF ARIZONA
COORDINATED BY THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA

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ON
HIGHER EDUCATION IN ARIZONA

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THE STATE UNIVERSITIES OF ARIZONA

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ARIZONA ACADEMY

PHOENIX, ARIZONA

In the frantic pace of modern society, men and women of real stature and unusual abilities too often are encapsulated in their particular spheres of activity. Their talents are devoted largely to their specialized occupations.

Yet the very qualities which have made these people leaders in their fields of endeavor are the ingredients so necessary to the understanding and solution of many of the broad problems society faces in common. Their appreciation of the scope of these problems and the objective judgment they bring to bear on the principles involved can be important contributions to our state and nation.

With these concepts in mind, the Arizona Academy was formed in January, 1962 to provide a vehicle to bring together different groups of leaders periodically for a thorough consideration of various broad problems facing Arizona. These groups are carefully selected to constitute a valid cross section of state leadership — geographically, occupation-wise, and representative of every shade of political, economic and social philosophy.

To this writing, there have been eight Town Halls, which are the mechanisms through which the Academy approaches these important problems. They have covered such vital fields as tax structure, welfare policies, elementary and high school education, revision of Arizona's constitution, public land policies, crime and juvenile delinquency, and others.

The Ninth Town Hall convenes at Casa Grande, Arizona, on the evening of October 9, 1966, for an intensive three-day study of "Higher Education in Arizona." The subject is a vital one, of tremendous importance to the Arizona of today and of tomorrow.

So that the participants in the coming session may have adequate background information from which to launch their detailed discussions, the Academy requested the state's three universities to develop a research report on the subject, coordinated by The University of Arizona, Tucson. Our sincere thanks go to these institutions for the outstanding job done by their researchers and presented in this volume.

While this material is published basically for use of the Ninth Town Hall participants prior to and during the October conference, we will subsequently bind into it the actual recommendations developed at Casa Grande on higher education. The composite document will then be made available to the legislature, various state, county, and municipal officials, and the general public in the hope that it will be of real assistance in abating this serious problem.

August 1966

Lawrence Mehren
President

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REPORT OF NINTH ARIZONA TOWN HALL

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ON THE SUBJECT

"HIGHER EDUCATION IN ARIZONA"

Nothing advances the welfare of the human race more rapidly than education, and nowhere is the advance more surely encountered than on the higher levels of education.

Arizonans have demonstrated an acute awareness of education's importance by allocating more of the public resources to its support than to any other activity. They have, in addition, revealed their concern for higher education in a great many ways that are detailed in the later pages of this volume.

The Ninth Arizona Town Hall, which was held at Francisco Grande Hotel at Casa Grande, October 9-12, 1966, was a massive demonstration of the state's interest in this vital subject.

Under the sponsorship of the Arizona Academy, the Ninth Arizona Town Hall brought together approximately ninety men and women, each a leader in his or her own field of competence and in community affairs on both local and state-wide bases.

These participants were carefully chosen to represent every part of Arizona geographically, to cover a great range of occupations and community interests, and to reflect a wide spectrum of social, economic and political philosophies. A particular effort was made to include able, representative spokesmen from the state's great institutions of learning, yet to make sure that what might be called the professional viewpoint would not dominate in numbers; by far the greater number of Town Hall delegates were from non-academic fields of endeavor.

Under the subject, "Higher Education in Arizona," these leaders of thought in the state were presented with a series of questions they had, in effect, developed for themselves in the many weeks of preparation that precede a Town Hall meeting. To obtain the widest possible expression of views in the most informal atmosphere, the group was divided into four panels, each following an identical discussion outline. The findings and recommendations of each panel were recorded as they were reached, and on the third day of the Town Hall, in plenary session, were combined, debated and adopted in the form here presented.

Obviously these findings cannot represent the conclusions or opinions of every participant in the Town Hall. Not every participant necessarily subscribes to all of the findings. Neither, however were they arrived at by the "majority vote" technique. To an amazing degree, perhaps credible only to those who have witnessed one of the Arizona Town Halls in operation, these findings do represent a consensus—a meeting of minds after exhaustive discussion of alternatives.

THE OBJECTIVES OF HIGHER EDUCATION

Since definitions precede fruitful discussions, the participants first sought to delineate the broad purposes of higher education. There was general agreement that these purposes include both the purely material and the philosophical. They should prepare the student for a productive, satisfying and fruitful life as a good citizen, developing his knowledge and attitudes to their greatest potentials, training him for leadership and providing him with moral, ethical and philosophical precepts from the great storehouse of man's knowledge. An auxiliary purpose is to improve and enlarge this sum total of knowledge.

Liberal Arts As a Basic Foundation

There was a feeling closely approaching unanimity that Arizona's institutions of higher education should insist upon a basic foundation in the liberal arts, with particular emphasis upon communicative abilities, even while meeting reasonable demands for specialized and vocational training. The role of the junior colleges in offering technical training was particularly stressed, but with the proviso that this should not preclude the liberal arts foundation previously emphasized.

In all phases of higher education, Town Hall delegates felt that a responsibility exists to maintain strong moral and ethical principles in the classroom, as they should be maintained in all segments of our society. Universities and colleges should continue to actively encourage off-campus religious centers for students.

The Research Function

Research as a responsibility of higher education won general approval. Town Hall feels that research should be encouraged insofar as it furthers the basic, broad purpose of higher education, and that the Board of Regents and faculties of the various institutions should strive for an academic balance so that the research function may supplement and improve the direct teaching function in addition to increasing the store of human knowledge. One panel felt that research in all areas of learning needs more emphasis in Arizona universities and that this would have a beneficial effect on teaching.

The Roles of the Respective Institutions

There was no dissent from the proposition that universities and colleges play an essential and vastly important role in Arizona's economy. They deserve great credit for what the state has become, and have a continuing duty and responsibility to study and serve the needs of the state in many specialized ways.

Town Hall was loath to attempt to recommend restrictions on the role in education of any of the states' institutions—universities, junior colleges or private colleges. Generally, it was recognized that private colleges and state universities do and should work in concert to meet general higher educational needs, with some greater freedom for development and innovation available to the private colleges, while the junior college role properly tends more toward offering a vocational supplement in its terminal programs and providing a complement in its transfer programs.

Suggestions for arbitrary assignment of different roles to the state's three universities were resisted by Town Hall delegates. It was a strongly presented view that junior colleges should plan their futures within the two-year framework, without aspiring to four-year university status.

Continuing education and retraining of adults, with considerable emphasis upon vocational courses at the junior college level, were felt to be proper functions of higher educational institutions, and were recommended for expansion where a significant demand exists. It was noted that such programs are largely self-supporting.

RESPONSIBILITIES AND ACADEMIC FREEDOM

Delegates expressed themselves strongly on the matter of the obligations of citizenship in colleges and universities. Town Hall felt that the freedoms and responsibilities of academic citizenship of students, including the responsibility to obey the laws of the land and the rules of the institutions they attend, do not differ from those of other citizens. Students, faculty and administration should recognize the moral, spiritual and ethical commitments that accompany citizenship, whether in a university or a nation.

Academic freedom was found to be an honored principle, upholding the highest precepts of citizenship, when it involves the right of a responsible person to inquire, discover, publish and teach the truth as he sees it. Such academic freedom is most properly exercised within the individual's specific field of competence and when accompanied by the fullest measure of academic responsibility. Academic freedom does not, however, relieve the academic community from the laws society has adopted to assure its survival. Most delegates agreed with Sidney Hook's definition of academic freedom:

> Academic freedom is a specific kind of freedom. It is the freedom of professionally qualified persons to inquire, discover, publish and teach the truth *as they see it in the field of their competence,* without any control or authority except the control or authority of the rational methods by which truth is established.

In relation to this academic freedom, it was felt that the institutions of higher learning have a duty to encourage a balance or range of views and philosophies in the composition of their faculties.

In the broader field of student life, Town Hall felt that any action under the aegis of the institution becomes an activity of the institution for which it bears responsibility. It was also felt that it is the responsibility of the institution, which is composed of governing boards, faculty and students, to adopt policies governing student activities and to communicate these policies to the parents and prospective students. It was recognized by many, however, that the institutions' responsibility could not be extended to cover every aspect of students' lives.

PUBLIC RESPONSIBILITY FOR HIGHER EDUCATION

Town Hall felt emphatically that a public responsibility exists to make education beyond high school available on the broadest possible basis to all motivated applicants. It concluded that Arizona closely approaches this goal under present policies. In this connection, one panel suggested an effort publicly to emphasize the worth and dignity of post-high school training in the crafts and vocational pursuits in order to overcome a possible reluctance to enter college on less than a four-year, degree basis.

Who Should Go To College?

Present admission requirements at institutions of higher learning, co-related with entrance examinations where required, were felt to be adequate under existing conditions. While such requirements should not now be raised, however, it was anticipated that the creation of additional educational facilities, including greater realization of the junior college potential, may make it advisable to give further consideration to raising university admission standards in the future.

Town Hall favored a public policy whereby those students who meet scholastic standards now in force in Arizona, and who are making satisfactory progress toward their educational goal, should be encouraged to complete their college education.

While all panels recognized the existence of some increase in enrollment as a result of military draft policies, it was not felt that this is in any way a significant problem.

Curricula and Standards

It was not felt that any substantial problem of "easy courses" exists, whereby degrees can be obtained with minimum effort and little actual development of the individual. There was strong opinion that more effective training at elementary and high school levels in basic subjects, as discussed in a previous Town Hall report, would have a salutary effect upon standards at the higher education level. There was, for instance, continued concern for improvement in all the basic skills of communication—reading, writing and oral expression.

Curricula should be determined by the needs of society as demonstrated by the many influences exerted on the educational institutions. These derive from such sources as the accrediting agencies, the professions, the world situation and other social and economic requirements. The determination of curricula based upon them should be recommended by faculty and administration to the appropriate governing board.

Financial Assistance to Individuals

Furthering Town Hall's support for universally available higher education, delegates commended existing state, federal and private financial assistance to worthy students, including the present policy of the universities permitting limited waiver of tuition, and urged additional efforts to aid students whose financial resources are limited. More emphasis was suggested on unrestricted scholarship and loan funds, student loan funds repayable from income after graduation so that students may finance their own education, Board of Regents grants to cover tuition where economically feasible, and encouragement to more private loans and grants.

In addition, the Town Hall concluded that efforts should be made to obtain Federal legislation granting income tax relief to individuals for payment of tuition and fees in a reasonable amount to institutions of higher education, private or public.

Priority development of additional work opportunities on campus and in local industry was suggested as a most desirable means of helping students to achieve an education by their own efforts, to the great benefit of themselves and society.

Out-of-State Students

Out-of-state students comprise an asset to higher education in Arizona, and to the state's economy as well, Town Hall delegates agreed. Great importance was placed on the advantages to Arizona students of establishing contact with other students from all over the nation and the world, as well as on the fact that many of the state's future leaders may be young people who came to Arizona as students and stayed to make their careers here. While there was some divergence of opinion as to whether out-of-state students directly pay the full cost of their attendance at Arizona universities, there was no dissent from the proposition that the state as a whole realizes great peripheral economic benefits from these students.

For these reasons, Town Hall felt that under existing conditions no limitations should be imposed upon out-of-state undergraduates except those required by the realities of space and facilities, and the fact that we must first take care of qualified in-state students. Because of the broader base and wider experiences necessary to fruitful postgraduate work, it was felt that no limitations not already existing should be imposed upon admission of postgraduate students from out of state to Arizona universities.

ARIZONA'S RESOURCES FOR HIGHER EDUCATION

How shall the state meet the needs imposed by the annual increase in number of students, compounded by the rapid rate of acquisition of new knowledge? The question initiated some of the most intensive discussion at Town Hall.

The participants agreed that bigness does not necessarily imply a sacrifice of quality. The quality of education in our colleges and universities depends on the caliber of administration and faculty, and on adequate equipment and facilities, regardless of size. The major factor in determining the effectiveness of higher education is not total student enrollment, but the faculty-student ratio, supplemented by imaginative use of today's and tomorrow's technology, which may provide new answers to problems of brick, mortar and communication.

Expansion and New Institutions

It was felt that expansion of existing universities around the present facilities and faculty cores will be sufficient for the near future, when coupled with a junior college program spreading into unserved areas and reaching additional communities. The Town Hall recommended new junior colleges throughout the state and recognizes the immediate need for the creation of additional junior colleges in the most populous counties.

While expansion of existing universities and creation of additional junior colleges were seen as the most desirable procedures for the near future, Town Hall did not foreclose possible eventual creation of one or more additional four-year institutions, but recommended continuing study to determine if such a need is developing.

The creation of branch campuses and the establishment of off-campus centers for graduate and specialized studies, but without weakening related disciplines in the parent institutions, were recommended. Also recommended for the universities was special attention to the cluster concept of college grouping, as recommended by Arizona's Board of Regents and envisioned by Northern Arizona University personnel.

Encouragement to Private Colleges

Town Hall expressed a pervasive, favorable attitude toward the founding and support of quality private colleges in Arizona. Positive action was urged for all leaders of the community, in and out of government, to attract private colleges to the state. One panel had the definite feeling that all levels of State and Federal government should use every legal means to make public land available at minimum cost to private colleges desiring to expand or locate in Arizona.

Another panel suggested that, even with the necessity of changing the state's Constitution or existing legislation, state scholarship support should be made available to Arizona students for use at any college of his choice in Arizona.

Supervision of Higher Education

Town Hall went on record as being unalterably opposed to any effort to create a single board or authority to supervise all public institutions of higher education in the state.

Delegates recognized a need, however, for increased communication, cooperation and coordination among these institutions, and urged an enlargement of voluntary efforts in this direction. It was felt that, with continued cooperation, the autonomy of separate boards heightens their responsiveness to the respective needs of colleges, junior colleges and graduate schools.

Faculty Staffing

Town Hall discussions revealed deep concern for the competitive position of Arizona institutions of higher learning in attracting and holding the services of highly qualified professional personnel. To assist the institutions in obtaining and retaining top-flight faculty members, Town Hall recognized that the state must:

1. Increase, within the state's ability to pay, faculty salaries and vigorously pursue initiation of an attractive retirement system and other fringe benefits.
2. Take whatever legislative action may be necessary to bring about favorable conditions in this regard.
3. Continue the development of an inviting academic atmosphere in which faculty members may live and enhance their capabilities and talents.

FINANCING HIGHER EDUCATION

There was general agreement that the question of financing is fundamental in considering the future development of higher education in Arizona. Strong sentiment opposed further increases in student fees to finance operating costs of the universities. While all delegates agreed that an increase in tax revenues will be necessary to meet growing operating costs of higher education, there was considerable divergence of opinion among panelists as to the specific source of such increases. At least half of the delegates favored no increases in the ad valorem taxes. Opinion was sharply divided as to whether necessary additional revenue should come from increases in income taxes, sales taxes or luxury taxes, with some delegates feeling that increases in all three might be necessary.

The belief was widely expressed that laws relating to tax exemptions in Arizona should be tightened.

Another panel recommended that a blue-ribbon citizens' group, including representatives of the legislature, should make a comprehensive study of the Arizona tax system in view of the reappraisal program now in progress.

Bonding for Capital Expenditures

Town Hall recommended that, to the fullest extent possible, the state should finance capital fund requirements for construction of physical facilities from general appropriations. Should such funds prove inadequate, Town Hall believed that general obligation bonds of the state, keyed to specific programs, and not revenue bonds, should be issued. One panel believed, however, that as far as possible revenue bonds should be utilized for the construction of dormitories and similar student service facilities.

Town Hall expressed general satisfaction with the present methods of financing junior colleges, including the existing division of responsibilities between counties and the state as provided by law. There appeared to be some sentiment that consideration should be given in the future to possible upward adjustment of student fees.

Federal Funds in Higher Education

The responsibility for higher education should remain a local and state matter. When revenue from these sources is inadequate to meet the basic financial requirements of higher education, then, it was felt, federal funds should be utilized. The hope was generally expressed that the conditions under which such funds are made available will not lead to any infringement on the autonomy of the institutions or local authority.

The principle of retaining at the state level funds which would otherwise go into the federal treasury was suggested as a possible alternative to federal grants to higher education.

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Throughout their discussions, delegates to Town Hall boldly underscored the duty of Arizona to provide the broadest possible spectrum of opportunity for higher education for the youth of this state, while recognizing that the enlarged price tag which will accompany such a program must be given the closest possible scrutiny.

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Francisco Grande Hotel, October 9-12, 1966

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CHAPTER I

A History of Higher Education in the United States

From early colonial days the people of our country have recognized the importance of and need for institutions of higher education. In 1636 Harvard College was established at Cambridge, Massachusetts, with the purpose of advancing learning and perpetuating it for posterity, especially to provide a learned clergy and an educated people. Not until 1693 was the second college created in this country, the College of William and Mary in Virginia. Yale College had its beginning in 1701, though only after fifteen troubled years was it settled in New Haven. All three of these colleges received some financial support from the colonial governments: ferry fees were allocated to Harvard and tobacco tax revenues to William and Mary. Although they might be considered as a result of this tax support to be state-private institutions in their origins, they were basically private in character and largely church supported. Ministers of various churches had a strong hand in their creation and in their operation. Other colleges founded prior to the revolution, generally with close church connections or religious influence, included Princeton University (as College of New Jersey at Princeton in 1746), Columbia University (as King's College in 1754), Brown University (as the College of Rhode Island at Providence in 1765), Rutgers University (as Queen's College at New Brunswick in 1766), and Dartmouth College in 1769. The College of Philadelphia, forerunner to the University of Pennsylvania, was established in 1740 as a non-sectarian college.

Although in the early years about 70 percent of their graduates became clergymen, the colleges were never merely theological seminaries but were expected also to produce an educated citizenry for service in government, for teaching, and for other careers. Nor were they institutions for the general populace; rather, they provided a classical education modeled after Cambridge and Oxford intended for the aristocracy of the colonies.

During the first two hundred years of American higher education the number of college graduates who entered the ministry declined, and there was a gradual movement toward secularization. By 1740 at Harvard, the graduates becoming ministers had fallen to about 45 percent and by 1840 to less than 10 percent of graduating classes. A similar decline in percentages occurred at Yale and the other colleges.

Curriculum development in the colonial colleges followed the pattern adapted by the English colleges from the medieval course of studies. Generally there was a prescribed program emphasizing literary and philosophical studies along with the classical subjects of Greek and Latin. Frederick Rudolph in his history, *The American College and University,* stated that "the founders of Harvard attempted to recreate at Cambridge the college they had known in the old Cambridge in England. And old Cambridge, as they had known it, represented an amalgam of Reformation and Renaissance emphases, a consequence of the fact that simultaneously in early 16th century England there had occurred the Protestant Reformation, the emergence of a gentleman class and a need for its training, and the first hints of humanistic learning. With an appropriate curriculum old Cambridge had been turning out clergymen, scholars, squires, public servants, men of contemplation and men of action, governors and governed."

The curriculum embraced more or less the idea of a rather fixed body of knowledge, crowned in the senior year by a course in moral philosophy, frequently taught by the college president, who sought to summarize, synthesize, and justify this body of truth. Until the Civil War, offerings consisted mostly of Latin and Greek, mathematics, logic, moral philosophy, and occasionally a little Hebrew, elementary physics, and astronomy. Courses were frequently badly taught, even in the classics, with great emphasis upon memorization and assignments that were but a continuation of the student's previous education. Laboratory work in chemistry and other sciences did not begin to become common until just prior to the Civil War. Until about 1850 Rensselaer Polytechnic Institute and the United States Military Academy supplied the entire force of engineers for the entire country. It was indeed a program of education for gentlemen.

To qualify for admission to Harvard during its first century, considerable competence in Greek and Latin was needed but nothing more. By 1800 it was expected that the entering student would know something about elementary arithmetic and between 1800 and 1870 additional admission requirements included some knowledge of geography, English grammar and composition, algebra, ancient history, physical geography, and United States history.

Geographically the early institutions were far apart, and when the College of New Jersey opened its doors in 1746, it was the only college between Williamsburg and New Haven. Prior to the revolution, there was no provision for public elementary education outside of New England, and recourse to private tutors or academies was necessary to prepare for collegiate studies. Since ours was an agrarian society and farmers could ill afford to give up the help which their sons provided, registration was generally very small in all of these institutions. At Harvard, the largest graduating class before the revolution was that of 1771 with 63 graduates, a number not approached again for 40 years, and at the outbreak of the revolution there were only 3,000 living graduates of American colleges.

For most colonial Americans a college education was not essential though the colleges were clearly a source of political leaders. Even among these men, however, such giants as Franklin had little formal education. Until the 19th century it was not necessary to attend college even to become a doctor, lawyer, or teacher, although such education constituted an advantage. College education in effect was geared for a small class and was a luxury that most young men neither needed nor could afford.

Education of Women

During the colonial period education in the colleges was for men exclusively. As early as revolutionary times women were fortunate to be able to attend an academy (seminary). In the late 18th and early 19th centuries there was little compelling reason for women to extend the education in Greek, Latin, and mathematics that they had received in the academies. Furthermore, they frequently married early, the time available for education was limited, and the need in an agricultural society was for homemaking and rearing children rather than for advanced education. Except for Mount Holyoke College established as a female seminary in 1837, Greensboro College in North Carolina in 1838, and Hollins College in Virginia in 1842, most of the well-known eastern colleges for girls including Vassar, Radcliffe, Smith, Wellesley, Bryn Mawr, Goucher, and Brenau were not established until during and after the Civil War. Others came still later.

Co-education began in America at Oberlin College in 1837, the same year as the founding of Mount Holyoke, with the admission of four women into the regular college course. Prior to the Civil War not more than six colleges adopted co-education, but after 1860 the state universities, particularly in the Midwest, gave impetus to the development of co-education in the United States. The University of Iowa in 1855 and the University of Wisconsin in 1863 opened their doors to women, followed by Indiana, Missouri, Michigan, and California. Those state universities which existed in the East, like Virginia and North Carolina continued to limit their admission to males.

The Land-Grant Act of 1862 stimulated the opening of new state colleges in the post-Civil War era, and the spread of state institutions and the establishment of new colleges in the Middle West contributed to a rapid growth of co-education. This movement continued until the post-World War II era when Clemson, Texas A&M, and a number of private colleges accepted admission of both sexes.

Characteristically, co-education is now almost universal among the colleges and universities of the United States. Some, like Harvard, Brown, Columbia College, Tulane, and Western

Reserve have their adjacent women's colleges of Radcliffe, Pembroke, Barnard, Sophie Newcomb, and Flora Stone Mather. Some, like Huntingdon College in Montgomery, Alabama, formerly exclusively for women, now admit men. Some have changed their name and become co-educational, such as Florida State University at Tallahassee, formerly Florida State College for Women. Separated higher education for the sexes still is found principally in the East and Southeast. Holdouts against mixing the sexes include such institutions as Princeton, Haverford, Williams, Amherst, Bowdoin, Kenyon, Lehigh, many of the smaller Catholic institutions, and a considerable number of colleges for women along the eastern seaboard.

The Early Beginning of Public Universities

Although the Colonial governments of Massachusetts, Virginia and Connecticut contributed financial support to Harvard, Yale, and William and Mary College, it constituted more a source of encouragement for higher education than an effort on the part of the governments to exercise any degree of control. Not until after the revolution was the first state university, properly so called, established. This honor is claimed by North Carolina,* whose Constitution of 1776 stated that "all useful learning shall be duly encouraged and promoted in one or more universities." The University of North Carolina was founded in 1789. Other states that established universities before the turn of the century included Georgia, Tennessee, and Vermont.

The broader development of state institutions of higher learning, however, had its basis in the Midwest in the provisions of the Ordinance of 1787, which provided for the governance of the Northwest Territory. It stated that "religion, morality, and knowledge, being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged." This Ordinance set aside one section of each township in the Northwest Territory for the maintenance of the public schools and an additional grant of two townships (72 sections) was made to each state for the support of a university. This provision for the grant of lands was confirmed in 1789 after the Federal Constitution was adopted, and five states benefited therefrom: Ohio, Indiana, Illinois, Michigan, and Wisconsin. The endowment of land laid the foundation for the creation of the great state universities of this country and served as a forerunner to the later expansion of public higher education by Federal land grants to the states under the provisions of the Morrill Act of 1862.

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*Disputed by Virginia and Georgia.

The establishment of nearly a score of state universities before the Civil War reflected growing interest among the populace in an education that was more practical for the American scene and further removed from the classical influences of higher education in the 18th century. It also constituted a movement toward popular education rather than for the aristocracy only, such as prevailed in earlier times.

Prior to the Civil War, most states, except for some urban areas of the Northeast, lacked a public secondary-school education system, and it was necessary, consequently, to lower admission standards, especially in some areas of the West in order to accommodate students from the rural sections.

In 1862 President Lincoln in the midst of the Civil War signed the Morrill Act establishing the Land-Grant College System throughout the United States. The Act set aside 30,000 acres of public land (or scrip in lieu of land) based on the census of 1860, for each member of Congress in the several states "for the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the pursuits and the professions in life." Thus, Morrill incorporated in his bill the leading reform notions in technical education. Ninety percent of the fund to be set up by the sale of land had to be maintained as a perpetual endowment.

The Morrill Act gave new impetus to the creation of state universities and land-grant colleges. By 1900 all the states except Alaska and Hawaii had created these institutions. Michigan, Pennsylvania, Maryland, and Iowa created A & M colleges out of previously chartered agricultural colleges. A large number of states including Wisconsin, Minnesota, North Carolina, and Missouri turned over to existing state universities both the land-grant endowment and the responsibility of serving agricultural and mechanical interests. Many states including Oklahoma, Texas, South Dakota, and Washington set up entirely new colleges which would henceforth compete with the existing state universities for public support. Four states—Ohio, California, Arkansas, and West Virginia—founded new state universities and added A & M components. The Sheffield Scientific School at Yale became the land-grant college in Connecticut, and similar arrangements were made for Brown University in Rhode Island, Dartmouth in New Hampshire, Rutgers in New Jersey, Cornell in New York, and other private universities in other states. Massachusetts created a new agricultural college and donated a share of the endowment to the Massachusetts Institute of Technology. In time, a number of southern states established separate A & M colleges for Negroes, and by 1961 there were 69 American colleges being supported under this Act and by subsequent related legislation.

Although a body of engineering principles and concepts grew up in this period of increasing invention and industrialization, agriculture had difficulty initially in attracting students. In Vermont not a single applicant in agriculture appeared up to 1873. At the University of Illinois in 1879 only 22 out of 200 students were enrolled in agriculture. Only one student graduated in Agriculture from the University of Wisconsin before 1880, and only seven students out of 122 at the University of South Carolina in 1884 were registered in the study of agriculture. Even in the 20th century farmers frequently remained unconvinced of the practical benefits from agricultural study at the state university. Only as science developed and was applied to agriculture and only after the farmers were shown the beneficial results of the application of such knowledge, did they recognize the need to study intensive scientific cultivation. Only then did agriculture come into its own as a major program in these institutions. Essential to this development, furthermore, was the Hatch Act of 1887, which provided Federal funds for the creation of agricultural experiment stations, which soon won popular support for the colleges, and the creation of the Cooperative Extension Service at the various land-grant colleges following the Smith-Lever Act of 1914 and subsequent federal financial support.

Before the Civil War, the state institutions commonly remained small and plagued by poverty and neglect. Not until late in the 19th century, after the Federal Government began to provide annual appropriations for the land-grant colleges, did the state legislatures undertake a policy of regular support and begin doing their part to finance discovery of new knowledge. The land-grant college system constituted a sharp break from traditional education and gave impetus to scientific study and discoveries that are still proceeding. Its influence was so great that in all types of institutions the classical education of Latin and Greek, philosophy, and mathematics gave way to a far more extensive listing of courses, programs, and specialties and lent new impetus to the expansion of knowledge.

Throughout the land these colleges resulting from the Morrill Act have tried to provide a college education for all students at the lowest possible cost so that young men or young women able and willing to take advantage of educational opportunities of college should not be denied the chance to advance their education. Of two philosophies, that of Thomas Jefferson which contemplated an educational system acting as a selective agency of society, was superseded by the Jacksonian philosophy of equalitarianism or equal opportunities and advantages to all people.

Growth of Private and Public Higher Education up to W. W. II

As indicated earlier, there was considerable acceleration in the founding of colleges after the Revolutionary War. From nine colleges in 1775, the number rose to 44 in 1810, and the next thirty years saw 112 new institutions founded. Between 1841-1870, an additional 314 new colleges were established, and in the last thirty years of that century, in response to the Morrill Act and the growth of population, increasing industrialization of the country and the changes that had occurred in the curriculum, 428 more institutions of higher education were established.

One writer (Rudolph) states that "college founding in the nineteenth century was undertaken in the same spirit as canal building, cotton ginning, farming, and gold mining. In none of these activities did completely rational procedures prevail. All were touched by the American faith in tomorrow."

Although the end of the last century saw the high mark in the creation of colleges and universities there were 316 new degree-granting colleges created in the first thirty years of this century and 146 between 1931 and 1960. These figures do not include any of the institutions created offering less than a four-year degree program. The latter category experienced an explosive development after 1900, with the opening of 175 junior colleges during the first thirty years of the 20th century and 185 during the succeeding thirty years – a greater number than new four-year colleges in the latter period.

The demand for education beyond the high school was becoming more and more a necessity as knowledge constantly expanded at an increasing rate and the learning offered in the colleges became more and more applicable to agricultural, industrial, commercial, and professional pursuits. The growth of this demand is apparent not only from the increasing number of students but also from the changing percentage of students of college age[1] who enroll in a college or university program. The number enrolled more than quadrupled between 1870 and 1900, and again more than doubled in the next twenty years. From 52,000 in 1870, the number of college students rose to 1,500,000 in 1940 and to over 5,000,000 today. From only one in sixty such young people who were enrolled in college in 1870, the ratio fell to one in 25 by 1900, to one in 21 in 1910, to one in twelve in 1920, to one in eight in 1929, one in six in 1945, one out of four in 1955, and two out of five today. Even more significant than the increase in size of the 18-21 population has been the pressure upon the facilities of higher education from the increased percentage of high school graduates who have gone on to college for further study. In the same manner pressures are affecting the graduate schools today as the undergraduate colleges were affected in the past 75 years.

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[1] All footnote references in this report are detailed on Pages 227 to 229.

TABLE 1
GROWTH OF HIGHER EDUCATION IN THE UNITED STATES, 1870-1940

	Four-Year Institutions					Junior Colleges	
				Degrees Conferred			
Year	No.	Enroll-ment	% of 18-21	B.A.	Ph.D.	No.	Enroll-ment
1870	563	52,000	1.68	9,400	1		
1900	977	238,000	4.01	27,400	382		
1920	1,041	598,000	8.09	48,600	615	52	8,000
1940	1,708	1,494,000	15.68	186,500	3,290	456	150,000

Source: *Historical Statistics of the United States, Colonial Times to 1957*, U.S. Dept. of Commerce, Bureau of the Census, Washington, D.C., 1960, pp. 210-211.

As might be expected, the average enrollment of colleges and universities has been growing also. Allan M. Cartter and Robert Farrell in a recent publication have shown that the average enrollment of institutions increased from 600 to 1,100 during 1920-1940 and to 2,650 in 1963 in our four-year institutions.[2] This growth in size has had tremendous impact upon administrative arrangements, instructional techniques, and student-teacher, faculty-administration, and student-administration relationships. Experimentation of instruction has been encouraged, fewer administrators teach classes, and large-scale administrative organization has become a necessity.

Curricula Development

This rapid growth in American higher education after 1870 took place during extensive change in educational programs. Beginning at Harvard under President Eliot an elective system in greater or lesser degree swept the country and replaced the rigorous required list of courses. Supposedly by having greater freedom of choice, students would have more opportunity to develop along the lines of their interests and capabilities. In practice, however, frequently the early product was a hodgepodge of courses and credits terminating in a degree.

It was during this age that the sciences, including the social sciences, became firmly established, and the scientific method was adopted in teaching and research, although research did not come into its own until well along in the twentieth century. While state institutions were appearing throughout the country and co-education was being accepted in most areas, influenced by trends at these universities, the increase in the accumulation of wealth and the establishment of foundations began to be more important to the private colleges and universities. Nevertheless, the trend was continually toward not only larger numbers of students in general but toward the assumption of a greater role in their education by the public institutions. By World War II, nearly half of the national enrollment was in public colleges and universities.

This was the era also of the development of professional programs like medicine and dentistry and of great advances in medical knowledge, with gradual lengthening of prerequisites for admission to the professional schools. First two years of college, then three, and today a four-year degree program is the common prerequisite for both law and medicine and a frequent one for dentistry. The development of veterinary medicine as a field fell to the land-grant colleges since it was one related to work being carried on in agriculture. Nursing became a college degree program, and there was expansion in fine arts programs in some technical schools. Schools of Business Administration, Architecture, Social Work, Library Science and others were established within universities and grew rapidly. Normal schools, the forerunners of the teachers' colleges were widely established through the states to provide teachers for the public schools, especially to meet the universal need of elementary school teachers. Junior colleges were created in increasing numbers to satisfy the needs of students who did not require a four-year degree program for their objectives.

The American system of higher education in fact largely assumed its present form by World War II. From small undergraduate colleges patterned after Cambridge and Oxford, and the founding of a graduate university at Johns Hopkins in the 1870's modeled on the German university, a diverse system of universities, colleges, and specialized institutions evolved that is distinctive to this country.

Higher Education in Other Countries up to World War II

Higher education had its origins in Europe, where a number of universities trace their origins back to the 12th and 13th centuries and some even farther back in a different form. Like the early colonial American colleges, the early European universities mostly received charters from the Pope or had church sanctions and frequently were connected with a cathedral in their beginnings. They were not universities as we know them today, and not all branches of learning were included in the curriculum. Rather, known first as *Studium Generale*, they sometimes taught only one main branch, for example medicine at Salerno and law at Bologna. Later they assumed the name *Universitas* and the term came to apply to both students and teachers. In time the teachers grouped themselves into faculties, and the dean represented the faculty in the university. The students on the council and the dean selected a rector, the chief administrative officer of the university. Some of these characteristics of administration carry over to the present day. The course of study, however, which often extended from four to seven years included the *Trivium* (grammar, rhetoric, and logic) and the *Quadrivium* (music, arithmetic, geometry, and astronomy).

With the passage of time, the curriculum has broadened in these different countries just as it has within the United States. Certain marked differences, however, have developed in the American system of higher education compared with that in Europe and other areas of the world. In America there is no governmental agency comparable to the Ministry of Education in France or Italy or other European states. Ours is a pluralistic system with many universities of different categories and sizes determining in large part for themselves the curriculum leading to the degrees which they confer. Approval does not have to be sought for a new course offering or for a new program from a national ministry of education. The Office of Education of the United States Department of Health, Education, and Welfare is quite a different kind of agency of government. It does not exercise the control over the higher educational system and content that a ministry of education does in foreign countries.

The American system, particularly since the creation of the land-grant colleges, has sought to make a higher education available to American students regardless of their financial status. The opportunity for "operation boot-strap" has long been open to the American student determined to have the benefits of a college education. The American people have accepted the idea that facilities should be provided to take care of those students who are able and willing to profit from these opportunities. The consequence has been a much higher percentage of students of college age being enrolled in an American college or university in contrast to the very small numbers of students that can be accommodated by the universities of foreign nations.

The consequence of our willingness to supply the facilities has meant that there has been a freedom of entry into the universities and colleges that is not available to many students abroad. Students in England, for example, have been committed to a technical business education or to no higher education at an early age, long before some might have been able to demonstrate the ability to qualify for a different type of education. "Late bloomers" have not had the opportunity in these countries that exist in the American system.

Another benefit of freedom from centralized control by the National government has been a high degree of autonomy in American institutions. They have freedom to experiment with new methods, new techniques of instructions, such as honors programs, interdisciplinary programs, and others which might be obtained in foreign lands only after much greater time has elapsed. A professor of the University of Nantes, for example, recently stated that before he could introduce a new course in American Literature he had to submit a syllabus and obtain approval from the French Ministry of Education in Paris, not only of the course but also of the text. There is a far smaller degree of regimentation in American higher education. While we have our regional and professional accrediting agencies that establish minimum standards for transferability of credits, a great number of colleges and universities can meet the requirements for accreditation notwithstanding rather wide disparities among the institutional members of the regional associations.

In Europe and Latin America and other parts of the world there is no counterpart to the Land-Grant system. One of the chief influences in the agricultural revolution in this country, which in many respects exceeds the accomplishments of the industrial revolution, has been the institution of the tripartite organization for instruction, for research, and for extension within our Land-Grant Colleges.

Another distinction is the relative absence of concentration of students in a single American institution, quite unlike the great numbers that congregate at the Sorbonne in France or at the National University of Mexico. Students here do not migrate to the capital to matriculate in the national university. There is no such concentration of numbers on a central campus in the United States comparable to those just mentioned. One consequence of that concentration is an increasing centralization of governmental functions in the capital and a movement of young people from the provinces toward the capital. The benefits of higher education are felt less in the provinces, consequently, than they are throughout the fifty states of our Union.

Finally, it has been noted already that opportunities exist for the American youth to obtain a higher education that are not available in other countries. In the 18-21 age group, 44 per cent of American young people now attend college, with the enrollment of this age group in Arizona reaching 69 per cent in 1965. Within a short time we will have one out of two people of college age enrolled in a college or university. No other nation in the world can even approach this figure. In 1957, in contrast, only 1 of 14 young people of college age in the U.S.S.R. or in Canada were enrolled in a university, only 1 of 20 in France, 1 of 25 in West Germany, and 1 of 33 in the United Kingdom.

With the demand that exists for more and more education in this technical age, it should be apparent that the availability of higher education to such large numbers of American youth is one of the greatest forces operating for the continued expansion of our economy and increase in our productivity and consequently for the continuing improvement of the economic well being of the American nation. The test of our system lies in the stability of our government and the progress that has been recorded in industry, science, medicine, the arts, and other aspects of American life.

National Characteristics of Higher Education in the United States after World War II

Since World War II, higher education in the United States has been characterized by extremely rapid growth and expansion. Beginning with the enrollment of the G.I.'s in 1946-47, the upswing of enrollments has been little short of a social phenomenon. Save for one brief period, enrollments have increased steadily and strongly, exceeding most pre-war forecasts by considerable margins. Only once since 1945 has the tide receded. In the period 1950 to 1953 there was a drop in enrollments brought about in double severity by the end of the G. I. Bill and a decrease in the college age population, resulting from the lowered birth rates of the depression years. Two principal factors are responsible for the enrollment patterns of the last two decades. The first is rapid population growth; the second is a steadily increasing demand for a college education.

The vanguard of G.I.'s touched the campuses of this country as early as September 1945; their impact reached its strongest point in the fall of 1947 when 1,149,933 veterans were enrolled, 79,966 under Public Law 16, and 1,069,967 under Public Law 346.[3] That same year the U. S. Office of Education reported a total of 2,338,226 resident students in 1,753 institutions of higher education. Thus in 1947-48 veterans represented approximately one half of all enrollments in colleges and universities.[4]

Hailed by some as one of the greatest experiments in higher education in this country, the G.I. Bill had profound sociological and economic effects. It was a smashing success from a number of different perspectives. It broke the ice and upset some cherished traditions. In the final analysis it altered to a degree the structure and form of higher education in this country, and it helped pave the way for the technological revolution ahead.

Institutions of higher education are traditionally cautious. Change comes slowly. Educational policies and practices are usually considered carefully by both administrators and faculty. Prior to World War II the backbone of the admissions policy of most institutions, public and private, was high school academic subject matter. Many secondary schools maintained a distinct curriculum for college entrance and another more general one for high school students who were not college aspirants. After World War II, when an exuberant American public put into law its expressions of gratitude to the men and women in the armed forces, it did so not in the form of World War I cash bonuses but in a program of rehabilitation that made available training in a wide spectrum of skills and professions to several millions of veterans. Part of this program provided college educations for the men and women who had served their country so successfully.

The colleges and universities of the nation responded with equal gratitude. Many admission standards were dropped for veterans, policies covering high school subject matter were adjusted so that deficiencies could be overcome. These changes were not without criticism, and many academicians looked with horror upon the rough, ill-prepared, over-aged veterans flooding the campuses. Dire predictions were common, ranging from the "lowering of academic standards" to the "creation of educational hoboes".[5] But the experiment was a success. The veterans, partially because of their maturity and partially because of their motivation, exceeded all expectations. Most campuses reported in fact that they performed academically on the average better than non-veterans.

The changes in admissions patterns brought about during these years were never fully re-established. The practice of allowing superior students with deficiencies in high school subject matter to make up their lack became more common. Greater emphasis was placed upon test scores and high school rank as criteria for admission. This change made college a greater possibility for students of superior ability who had not followed the formal pattern of the college preparation curriculum in high school.

As the wave of veterans crested, many colleges took emergency measures to accommodate them. Temporary buildings were hastily erected, many of them former army barracks; dormitory space was created by doubling room occupancy, and even hallways held beds in the emergency.

By 1950 the tide had begun to ebb. In 1951 the trough was reached. Then through 1952, '53, and '54, after the veterans left, enrollments recovered again but very gradually, for these were the years that the 18-21 year olds born during the depression were eligible for college. The depression was a poor time to rear large families, and consequently the birth rate had fallen sharply in these years. In 1951 the number of 18-21 year olds dropped to 2.1 million from 2.4 million in 1949.

Increases in both the 18-21 year old group and in college enrollments though not spectacular were fairly steady throughout the remainder of the fifties, but there were certain ominous signs and a distant clamoring in the background.

The college attendance as a percentage of the 18-21 year population hovered around 25 percent in the late 40's and early 50's. By 1954 this percentage inched up to 29, in 1955 it crept slightly over 31 percent, then it moved steadily upward in jumps of one and two percentage points a year. This growing percentage of 18-21 year olds in college was the first sign. The second sign was the increasing number of people reaching college age approaching the campuses, grade by grade, throughout the 50's.

Beginning in 1945 when the veterans began returning from overseas, both marriage and birth rates took a sudden upward turn. Marriages reached their peak in 1946 and births in 1947. Marriage rates returned to normal within a few years but birth rates stayed high until about 1960, then gradually began tapering off in the early 60's.

The first wave of post-war births reached the campuses in September 1963 and sent enrollments up 10 percent; by September 1965 they rose another 12 percent. In the four years previous to 1963 the average rate of increase had been about 7.5 percent.

Thus two factors conjoined in 1963 to raise enrollments in the span of two decades from slightly over two million in September 1946 to five and a half million by September 1965 — the high birth rates of the late 40's resulting in a large population of 18-21 year olds in the mid 60's, and a steady increase in the percentage of 18-21 year olds attending institutions of higher education.

The steady increase in the percentage of 18-21 year olds attending college is a phenomenon that needs elaboration. What are the factors behind the steady and persistent rise in the percentage that college enrollments are of this group? There are a number of explanations. No one of them seems sufficient to account for the phenomenon on its own. It can best be explained by stating some of the more important variables involved.

The method of computing the percentage should be briefly reviewed because an explanation of it provides some insight into one of the factors affecting the percentage. When we speak of college enrollments as a percentage of the 18-21 year old group, it should be understood that all college students do not fall within the ages of 18 and 21. A few are younger than 18; a considerable number are older than 21. Eighteen to twenty-one year olds are commonly used as a basis for such calculations because there is a higher correlation between the 18-21 year old group and total attendance in all levels of higher education than with any other college group. Somewhat over 50 percent of the enrollments in universities are within the 18-21 group. Considerably more of the student bodies of junior colleges and four-year colleges fall within this age bracket. Therefore the percentage calculated by dividing enrollments in higher education by the total number of 18-21 year olds in the nation, a region, or a state is somewhat distorted by the presence of students less than 18 or more than 21.

Nationally and within this state more and more students are seeking advanced degrees. Since most graduate students are over 21, they tend to raise the percentage that college enrollments are of the 18-21 year group. Some of the upward trend in the percentage of 18-21 year olds on campuses can be attributed then to the increase of graduate enrollments and the attendance of students over 21 who are not graduates. There are, however, other factors causing the increase.

As the standard of living in America has risen, more and more families have been financially able to send their sons and daughters to college. In part this has been possible because the cost of an education to the student in a public institution has just about kept pace with the rise of family income. This has been particularly true in the case of resident fees. Thus, in 1951 the cost of resident fees represented about 3 percent of the average U. S. family personal income after taxes. Twelve years later, in 1963, resident fees represented about 4 percent of the average U. S. family personal income after taxes. Costs to the student in private institutions have risen much more rapidly, moving from 13 percent of average family personal income after taxes in 1951 to 20 percent in 1963. As the average family income of the nation has risen, it has become financially possible for more and more families to send their sons and daughters to college, particularly to public institutions.

The growth of junior colleges since 1947 has been exceptionally rapid, and this has been a strong factor in the rising percentage of 18-21 year olds in colleges. The junior college has functioned in this way for two reasons. It is extremely economical to attend, and it offers a wide variety of technical and vocational programs which have broadened the spectrum of educational choices considerably.

Higher education has become more popular since World War II. Partially as a result of its popularization through the G.I. Bill and partially because of the emphasis put on higher education by the government, high school counselors, and the mass media as a result of Sputnik and the technological revolution, more and more high school students have turned to colleges for professional preparation.

The technological revolution has opened new avenues of opportunity for the college graduate. One needs only to witness the vast array of recruiters who travel to campuses throughout the country each year to comprehend the present great demand for college graduates. Increasingly a college degree has come to mean higher wages and more financial security for a larger proportion of the population. This naturally results in increased demand for higher education. Businessmen and industrialists as well as the government have all learned that the college educated employee is a decided asset, and consequently employment opportunities have never been better for degree holders.

Federal and state loan programs for college students have had an impact upon enrollments. Needy students find it easier to obtain financial assistance for a college education through both public and private loan programs. Because easier access to financial aid is available through insured loans and private loans, more and more students are able to attend colleges and universities simply because more funds are available to help them.

The economic shift from unskilled labor to more and more professionally qualified specialists is also creating a large demand for college graduates. The typical high school graduate sees his future in terms of such specialization rather than in one of the unskilled categories and is consequently drawn into higher education more readily than prior to World War II.

The armed forces are increasingly using the colleges and universities to train specialists and to upgrade their officer corps. These programs have had some impact upon the increasing proportion of enrollments as a percentage of 18-21 year olds.

Federal Support for Higher Education Since World War II

Another trend which has characterized higher education since World War II has been the tremendous increase in federal support of both public and private institutions. This support has come in a number of different ways: through fellowships and training grants, through veterans education, through facilities grants, through student loans, through research grants and contracts, through support of specific programs, and through general institutional grants.

The growth of federal support of higher education is best conveyed through a number of different examples. The federal government spent about $15 million a year in 1940 for research and development at institutions of higher education.[9] By 1949 this had grown to $44 million. In 1960 it was $545 million, and in 1964, $512 million.

Other types of federal support have had, though somewhat less dramatic growth than is evident in research and development expenditures, substantial increases. The student loan program for higher education has doubled since 1960, increasing from $50 million then, to $100 million in 1964. College housing loans have also doubled in this same five-year period, from 171 million to 390 million dollars. Total direct support of higher education excluding loans has grown 91 percent between 1960 and 1964. Such support now stands at almost one and one half billion dollars; in 1960 it was $734 million. Training grants by the federal government in institutions of higher education have doubled, fellowship support has tripled, institutional grants have also tripled during the last five years.[7]

This federal aid has been distributed both to public and private institutions and some aid has been felt at all levels of higher education.

The trend toward increasing public support of private institutions of higher education is especially noticeable since World War II. Such support has come from two primary sources, federal and state, with federal support dominating. This phenomenon will be discussed in more detail in a later section of this report.

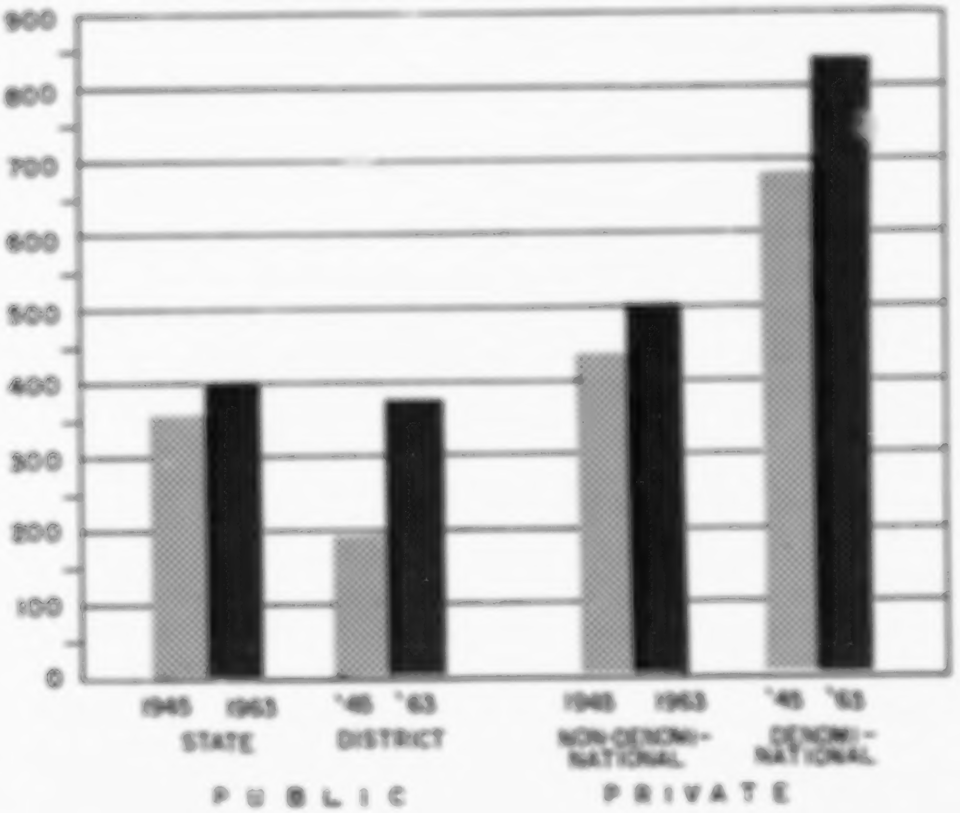
Numbers of Institutions Since World War II

If one examines the number of institutions that have come into being since World War II, it becomes evident that growth in higher education during the 50's and 60's has come about largely through the expansion of existing institutions rather than through the creation of new ones. Whereas enrollments have more than doubled since 1945, there was only a 25 percent increase in the total number of institutions of higher education in the United States up to 1963-64 and these have been largely junior colleges. The following graph shows this growth of institutions of higher education by control.

It can be seen in the following graph that the greatest growth has occurred in district-controlled institutions which are typically junior colleges. The second and third greatest growth occurred in the private institutions with denominational institutions increasing 23 percent and non-denominational 14 percent. State controlled institutions have had the lowest amount of growth, increasing from 359 institutions in 1945 to 405 in 1963, an increase of 13 percent.

FIGURE 1

COMPARISON OF THE NUMBER OF PUBLIC AND PRIVATE INSTITUTIONS OF HIGHER EDUCATION IN THE UNITED STATES, 1945 AND 1963



It has been pointed out earlier however that the greatest growth in terms of enrollments has occurred in the public institutions. So, although the number of private institutions is now double the public, and although the rate of growth of the number of private institutions has been slightly more than that of public institutions, public institutions have currently almost twice the enrollment that private institutions have.

REGIONAL CHARACTERISTICS OF HIGHER EDUCATION IN THE UNITED STATES

Private and Public Institutions

If a map of the United States were shaded, and the intensity of the shading were varied according to the percentages of college population of each region enrolled in *public* institutions of higher education, the darkest area on the map would appear among the western states; the lightest area among the eastern states, with the midwestern and southern states shaded a little darker than midway between the intensities of the West and the East. Thus, in terms of the percentage of total regional enrollments, the East has 38 percent in public institutions, the Midwest 64 percent, the South 69 percent, and the West 78 percent.

In the East, enrollments in private institutions presently overshadow public for a number of reasons. Historically, private institutions were the first to be established in this country, and they were mainly established along the eastern seaboard. Harvard, William and Mary, Yale, Princeton, King's College (Columbia), the College of Philadelphia (University of Pennsylvania), College of Rhode Island (Brown University), Queen's College (Rutgers), and Dartmouth are early examples of private institutions established in this period. With a strong group of private institutions already operating, public institutions in the East did not at first achieve the kind of popular support needed to make them flourish.

Similarly in the South and Midwest, although public institutions have played a much larger role in the development of higher education, private institutions have developed side by side with public institutions to a greater degree than has been the case in the West.

Higher education in the West is predominantly public for a number of reasons. The early populations of some of the western states could not have supported private institutions adequately at the time the need for them became evident. The West did not have in its early development the same degree of traditional influence which helped shape educational patterns in the East. For the most part the settlers of the western states did not have in their backgrounds the strong tradition of education in private institutions that the policy makers of the eastern states had. A tendency to move in new directions in the establishment of institutions of higher education in all probability met with greater acceptance in the West partially because the pressures to follow traditional directions were not as strong.

Because of the East's reliance on private institutions to carry the burden of higher education some state systems did not flourish. New York state, for example, until recently supported a state public education system composed largely of teacher education colleges. The State University of New York was not located in the heavily populated areas because these were served primarily by municipal and private institutions such as the City University of New York, New York University, and Columbia. The predominance of the private institution in New York state was so strong that land-grant agricultural and home economics programs were established at Cornell University, a private institution. Thus the land-grant function of Cornell is public while the institution in general is private.

This split between public and private control demonstrates an interesting trend. It is becoming increasingly apparent that the dividing line between private and public institutions is not a hard and fast one. Most private institutions have public charters and through their boards of trustees are publicly regulated. Most receive public funds in one form or another. Some are supported in part by state or local funds. The University of Pennsylvania for example receives an annual appropriation from the state just as certain other private institutions in Pennsylvania do. On the other hand, public institutions often receive endowments from private sources some of which contribute substantially to their operating budgets. The definition of a private or public institution rests then upon its principal source of income, private institutions drawing principally from endowment and student fees, and public institutions drawing principally from appropriations and student fees for instructional programs.

Student Fees at Private and Public Institutions

In general the size of the student fee at private institutions has been considerably higher than the non-resident student fee at public institutions. This important difference accounts in part for the fact that public institutions nationally enrolled 67 percent of the students in higher education in the United States in September of 1965. The growth of enrollments in public institutions can also be attributed in part to the rapid expansion of public community colleges. The cost of attending colleges can be divided between tuition or fee charges, and room and board. At public institutions fees represent a much smaller part of the total cost than at private institutions for state residents living on campus. In some cases, since living costs are usually the largest share of total costs, it is less expensive for a student to attend a private institution while living at home than to attend a public institution in another part of the state and pay both fee and living costs. However, if there is no institution within commuting distance it is normally less expensive to attend the public institution. Similarly if there is a public and private institution within commuting distance, it is normally less expensive to attend the public institution because fees are lower.

In the case of public junior colleges tuition is usually very low and sometimes free, reducing the costs to the student still further. A public junior college within commuting distance is usually the least expensive form of higher education available to the student.

Other Costs to the Student

It should be borne in mind that neither living costs nor tuition costs are in the final analysis the greatest cost the student and his family must bear. The single greatest cost is income forgone during the period the student attends school. For the average high school graduate this may amount to three or four thousand dollars a year. These dollars foregone, plus the cost of the education, are usually in the long run recovered and surpassed by the higher salaries earned by college graduates. This is evident by a comparison of the mean annual salary of high school graduates and college graduates shown on the following page.

TABLE 2
MEAN INCOMES OF MALES 25 TO 64 YEARS OLD
BY YEAR OF SCHOOL COMPLETED, 1961

	Mean Yearly Income
Elementary	
Less than 8 years	$3,483
8 years	4,750
High School	
1 to 3 years	5,305
4 years	6,102
College	
1 to 3 years	7,932
4 years or more	9,530

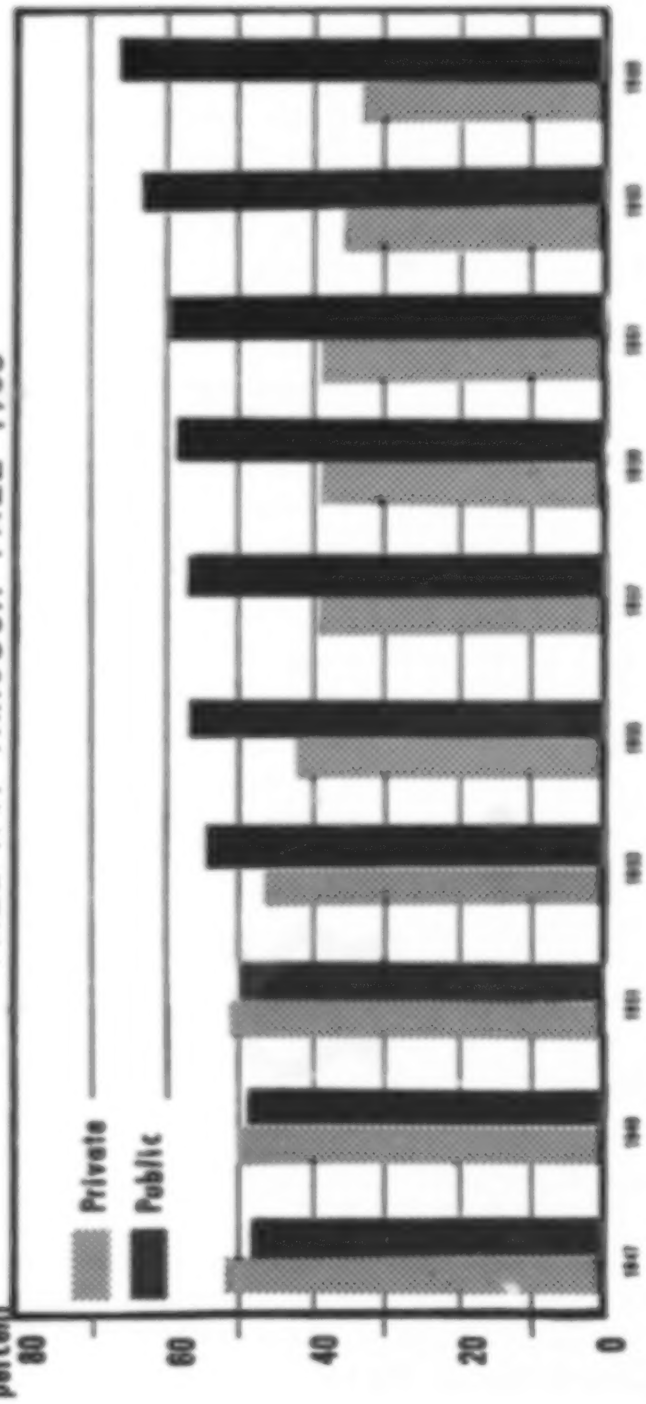
Source: *Statistical Abstract of the United States*, 1964, p. 115.

It has been pointed out that there is some bias in these figures. It can be assumed for example that those students who complete high school and those who complete college are on the average a better motivated, and in some cases a mentally more qualified group than those who did not complete high school or college. If this is the case, some of the difference in higher mean salaries can be attributed to better motivation and better qualifications. What we really need to know is the mean salary of typically motivated and qualified high school and college graduates if they do not complete their education, and this statistic is by definition impossible.

Enrollment in Public and Private Institutions

Public institutions have expanded in size in accordance with demand much more readily than private institutions. This is evident in the following graph. It can be seen that the proportion of total U.S. enrollment has moved from a point in 1947 when private enrollments slightly exceeded public enrollments to a point in 1965 when public enrollments are almost twice the size of private. To a great extent private institutions have responded to the greater increases in demand by increasing admission standards and handling proportionally less of the total en-

FIGURE 2



PERCENT DISTRIBUTION OF TOTAL ENROLLMENTS
OF DEGREE-CREDIT STUDENTS
FALL 1947 THROUGH FALL 1965

Source: A Fact Book on Higher Education, American Council on Education, Washington, D.C., p.21.

rollment each year. There has been greater increase in the number of private institutions but for the most part these have been very small installations which have not had very much impact on the total enrollments in private institutions.

In the East where the early established institutions were private, public institutions have played a much weaker role in terms of handling student enrollments than private institutions. In the South and Midwest where public and private institutions have developed side by side, public institutions have grown faster than the private. In the West public institutions, although they are outnumbered by private institutions, account for about 79 percent of the total enrollment in institutions of higher education.

This has some interesting social implications. Higher education is one of the principal means by which upward mobility is maintained within a social system, but in order to provide full mobility education must be priced so that upward movement can take place even from the lower financial levels. This cannot happen if educational charges borne by the student are too high. The higher the tuition charge therefore, all other variables being equal, the less the range of upward mobility.

It is commonly argued, particularly by the more expensive institutions, that scholarship programs provide even at private institutions enrollment opportunities for students from lower income brackets. The number of such scholarships available represents however a very small proportion of the potential students at the lower income levels. If, therefore, upward mobility is best achieved by public institutions, it follows that upward mobility is at its best in those areas served to the greatest extent by public institutions with tuitions priced to allow admissions from the lower income brackets.

Interstate Cooperation

A regional characteristic that is a recent development is interstate cooperation in higher education. Three regional cooperative groups are currently in existence: the Southern Regional Educational Board (established in 1948), the Western Interstate Commission for Higher Education (1953), and the New

England Board of Higher Education (1954). These regional compacts have coped with a number of different problems ranging from the use of joint facilities to the organization of conferences to solve mutual problems. The Western Interstate Commission for example provides programs in interstate cooperative education. A state lacking a particular educational program can by means of the Commission send students desiring such a program to other member states where the student will, academic qualifications having been met, receive preferential consideration for admission. There are a number of such subject areas that are covered in the agreement.

Accreditation Cooperation

The responsibility for setting academic standards in higher education has been traditionally a voluntary cooperative effort in higher education on the local, state, regional, and national scene. This cooperative arrangement among American universities and colleges is the closest thing to the official ministries of education which control and set educational standards in a number of other countries.

Intrastate Coordination

Since 1945 as enrollments in public institutions have grown there has been increasing emphasis on coordination of higher education, particularly at the state level, although as we have seen in earlier pages coordination occurs also at the regional and national levels.

State coordination has been typified by a diversity of forms. Indeed, it is safe to say that in general no two states have developed identical systems. Each different coordinating system tends to reflect the particular problems and needs of the state adopting it. It can also be said that in general coordinating systems have come into being in those states where the greatest needs for coordination have arisen. Typically these states are the ones with a diversity of public institutions.

The multiplicity of state coordinating systems can be grouped into three general types: the single governing board, the coordinating board, and voluntary coordination.

The earliest form of coordination is the single governing board for the state institutions of higher education. Florida, as early as 1905, and Iowa in 1906 adopted such coordinating agencies. There are presently about thirteen states using a single board as a means of coordinating higher education within the state. Needless to say there is considerable variation among these single board systems, ranging from differences in authority to differences in representation upon the board. Of those states with more than two public institutions of higher education only Arizona (1945), New Hampshire (1963), and New York (1948) have followed this pattern since 1931. One of the chief obstacles to forming a single coordinating board has been the political and administrative problems involved in creating one board when a number of such boards are already in existence.

The problem of forming a single board from a number of existing boards has led to an alternate approach. In a number of states where two or more big boards are in existence, a coordinating board has been created. This type of agency has now become one of the principal approaches to coordination where a single board is not in existence. Whereas the single board has been adopted by only three states since 1931, in the past five years thirteen states have adopted the coordinating board. There are now about twenty-one states using this approach.[8] Certainly much of the popularity of this approach to coordination is the ease with which it can be initiated: existing boards remain and vested interests are not interrupted to the degree that compulsory coordination under a single board produces.

Coordinating boards can be typed in two categories which have considerable variation in membership and authority. The relative merits of these two types of coordinating boards are the subject of some controversy among educators and legislators.[9]

The crux of the controversy lies in who shall comprise such boards. A number of states including Oklahoma and New Mexico have coordinating boards constituted of public appointees only, with no formal representation from the governing boards of the various institutions or from the institutions under these boards.

Utah and Illinois, to name two, each have boards with representatives derived from the separate institutional boards. Wisconsin and California also include representation of the

England Board of Higher Education (1954). These regional compacts have coped with a number of different problems ranging from the use of joint facilities to the organization of conferences to solve mutual problems. The Western Interstate Commission for example provides programs in interstate cooperative education. A state lacking a particular educational program can by means of the Commission send students desiring such a program to other member states where the student will, academic qualifications having been met, receive preferential consideration for admission. There are a number of such subject areas that are covered in the agreement.

Accreditation Cooperation

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A third type of coordinating agency is voluntary. Such agencies are usually composed of presidents or heads of all public institutions within the system. There is occasionally representation from private institutions when these play a dominant role in the educational picture within the state. Junior colleges are sometimes represented on voluntary boards and on coordinating boards whereas in the case of a single board junior colleges frequently are under a separate agency.

CHAPTER II

History and Structure of Higher Education in Arizona

Arizona's people and leaders have demonstrated a continuous interest in higher education. At the first session of the Territorial Legislature in 1864, Governor Goodwin recommended the establishment of a university. Legislation during this session provided for a university and a three-man board of regents was appointed, one of whom was shortly killed by Indians. The university remained unestablished because funds were not provided, and legislation lapsed. The problems of frontier life were severe and the people of Arizona had little time for higher education.

On March 12, 1885 the 13th Territorial Legislature, meeting in Prescott, established the University of Arizona at Tucson and the Arizona Territorial Normal School, now Arizona State University, near Tempe. In arguing for "The University Bill," Selim Franklin said: "Let us establish an institution of learning; let us pass this bill creating a university, where for all time to come the youth of the land may learn to be better citizens than we are; and all our shortcomings will be forgotten in the misty past, and we will be remembered only for this one achievement. For your salvation, Gentlemen, you must vote for this bill." The bill passed on the last day of the session, a day which marked the beginning of higher education in Arizona.

The remainder of this brief history takes up the three types of institutions now operating: public universities and junior colleges, and private colleges.

Public Universities

The people of Arizona are presently providing financial support for three universities. Each has a rich history, only small portions of which follow.

Arizona State University: On February 26, 1885, House Bill 164, An Act to Establish a Normal School in the Territory of Arizona, was introduced in the 13th Legislative Assembly of the Arizona Territory. The bill passed the House on March 6, the Council on March 11, and was signed by Governor Tritle on March 12. The first classes were held in 1886. Located at Tempe, the institution was first named the Arizona Territorial Normal School. The name was changed to Tempe Normal School in 1912, to Tempe State Teachers College in 1925, to Arizona State Teachers College at Tempe sometime prior to 1945. In 1945, when House Bill 136 placed all three four-year institutions under a single board, the name became Arizona State College at Tempe and was changed finally to Arizona State University in 1958.

The college was given the privilege of granting bachelor's degrees in 1925. Important recent degree authorizations include: Doctor of Education (1952), Bachelor of Science in Engineering (1956), Master of Arts (1956), Master of Science (1956), and Bachelor of Science in Nursing (1957). Since 1957 professional degrees in Engineering, Architecture, Fine Arts, Public Administration, Natural Sciences, Music, Business Administration, and Social Work have been added. These authorizations, and others which followed, document the phenomenal growth of the institution since 1955.

The first Doctor of Philosophy degrees were authorized in 1961 in the fields of Chemistry, Physics, Psychology, English, Engineering and Education. Mathematics, Botany and Zoology have since been added to the doctoral fields open to qualified candidates.

Northern Arizona University: On February 6, 1899, Henry F. Ashurst introduced House Bill 41 in the Territorial Legislature proposing the establishment of the Northern Arizona Normal School. The bill was speedily passed. In March, 1899 plans for the school were completed and the first term began in September of that year. Four young women received two-year diplomas in 1901, which warranted them life certificates to teach in the schools of Arizona. In 1925, the state legislature changed the Normal School to a four-year, degree-granting college, offering the Bachelor of Education degree. The name of the institution became Northern Arizona State Teachers College. The name became Arizona State Teachers College at Flagstaff in 1928, then Arizona State College at Flagstaff in 1945, and finally Northern Arizona University on May 1, 1966.

The 1937 state legislature granted the college the right to offer courses for graduate credit and to confer the degree of Master of Arts in Education. Bachelor of Arts and Bachelor of Science degrees were authorized in 1947 and Master of Arts and Master of Science degrees in 1957. In 1962 an administrative reorganization created Schools of Business Administration, Education, Forestry, Liberal Arts, Natural Sciences, and Technology and Applied Arts. When university status was attained in 1966, four of these six schools became colleges.

Northern Arizona University has thus developed, in 67 years, from a one building Normal School to its present dimensions. Phenomenal growth has taken place since 1955 and, at the present time, the rate of growth is faster than at any other period of its history.

The University of Arizona: Although founded in Tucson in 1885, the university did not open its doors to students until 1891. The first bachelor's degree was awarded in 1895. Upon opening, the university consisted of two colleges, Agriculture and Engineering. Through the years, eleven colleges have developd primarily from schools and departments which evolved within other colleges of the university: Liberal Arts (1915), Education (1920), Law (1925), Fine Arts (1934), Graduate (1934), Mines (1940), Business and Public Administration (1943), Pharmacy (1949), Medicine (1961), Architecture (1964), and Nursing (1964).

The university was organized in accordance with the Act of Congress of 1862 known as the Morrill Act. Throughout its history, the University of Arizona has been the land-grant institution of the state and thus is a part of the world-famous system of land-grant colleges and universities of the United States.

After its beginnings in pioneer days the University advanced slowly during the first twenty years of its existence. The number of graduates was never more than ten a year. When Arizona became a state in 1912, the university entered upon a decade of rapid expansion. The College of Liberal Arts was added and the university was accredited by the North Central Association of Colleges and Secondary Schools. Enrollments increased markedly and the first doctorate was granted in 1919. In a decade of rapid growth, the Colleges of Education and Law were established, the Schools of Home Economics and Music were created, and the Agricultural Extension Service, the Arizona Bureau of Mines, the Correspondence Course Bureau, and the Division of Continuing Education were organized.

In the years from 1926 until the end of World War II, the university matured and became a respected institution of higher education. During the depression of the 1930's and the war that followed, organizational changes were limited but included the development of four new colleges and an Engineering Experiment Station.

Since World War II, and especially since 1955, the university has experienced a period of phenomenal growth in enrollments, in physical plant, and in academic programs. Four new colleges were added bringing the total to thirteen at the present time. Also, more than twenty institutes, bureaus, laboratories, and divisions for special services have been created. In the mid 1950's considerably greater emphasis was placed upon the contributions which university scholars could make through basic research. New graduate programs were developed to the point where master's degrees are now offered in 75 fields and doctorates in 45 fields. Several millions of dollars received annually from various foundations and the federal government now supplement state appropriations.

Junior Colleges

Two junior colleges began offering college level work in Arizona in 1920. Although founded considerably earlier, Eastern Arizona College did not offer college level work until 1920, the year that Phoenix College also opened its doors to students. In 1927, the state legislature passed an act legalizing the creation and maintenance of junior colleges in Arizona. These two institutions were the only junior colleges operated in Arizona until after 1960 when the state legislature created a state junior college board and passed laws permitting the establishment of county college districts supported in part by counties and in part by the state.

The legal structure under which all junior colleges in Arizona are now operating is contained in Chapter 6.1 of the Arizona Revised Statutes, Title 15, Education. While it is still possible to operate junior colleges as part of a high school district, no such institutions are in operation at the present time. Since the passage of this legislation, both Phoenix College and Eastern Arizona College have become members of the state junior college system.

At the time of this report, four of the state's fourteen counties have established and are operating junior colleges. An additional four counties are involved in the establishment process to a degree that it is possible that the number of counties with junior colleges will double by 1970.

There are now six junior colleges operating in Arizona. While space does not permit a comprehensive historical review for each institution, brief accounts are presented below.

Eastern Arizona College: In 1888, the St. Joseph Stake of the Church of Jesus Christ of Latter-Day Saints chose a local Board of Education to promote the interests of education in that stake. In December of 1890 the St. Joseph Stake Academy, offering the equivalent of a high school education, opened its doors to 45 students. The Academy was closed from 1896 to 1898 but was reopened and formally dedicated in the latter year. Beginning in 1911, a series of name changes took place as follows: Latter-Day Saints Academy, Gila Academy, Gila Normal College, Gila College, Gila Junior College, Eastern Arizona Junior College, and finally Eastern Arizona College. The first college-level courses were introduced in 1920.

On March 25, 1933, the citizens of Graham County voted to accept and maintain the college. Courses in religious education were dropped and the school became non-sectarian. After 1937 the state paid a portion of the maintenance cost until Eastern

Arizona College was integrated into the state junior college system in 1962. Eastern Arizona College thus became the first college to enter the system of junior colleges. In 1961 Graham County passed a $500,000 bond issue, matched by state funds, and a considerable expansion of the physical plant followed. Enrollment in September of 1966 will be approximately 1,100.

Phoenix College: The college was established in 1920. In 1927 the college achieved legal status when the state legislature passed an act legalizing the creation and maintenance of junior colleges in Arizona. The Board of Education changed the name from Phoenix Junior College to Phoenix College in 1947. In 1962, the voters of the district approved the transfer of Phoenix College to the jurisdiction of the County Governing Board, effective July 1, 1963. The college has been at its present location on West Thomas Road since 1939, having previously been housed in the Phoenix Union High School. From a single curriculum in 1920, the college has increased its offerings to more than thirty. It is the largest of the junior colleges now operating. By September of 1966 the enrollment is expected to be over 12,000.

Arizona Western College: The college was created on September 12, 1961 by the voters of Yuma County. The initial campus was constructed during 1962-63 and classes began in September, 1963. The college was the first to be organized under the Junior College Bill of 1960. It was the first state-supported collegiate institution opened in Arizona after Phoenix College came into being in 1920. The college has grown very rapidly and, in the last year a complete agricultural complex of three buildings and a modern farm laboratory, a Business Building, Mechanical Technology Building, a Library Learning Center and a third dormitory have been completed. Arizona Western College now has 24 refrigerated buildings. Its enrollment in September of 1965 was 1,670. Its 1966 enrollment will probably exceed 1,800.

Cochise College: This college was the second junior college organized under the 1960 act providing for county junior colleges. The district was established in 1961, buildings were constructed in 1962, and its door opened in September of 1964. The

540-acre site is on Highway 80, approximately sixteen miles east of the Bisbee-Lowell-Warren area and eight miles west of Douglas. Response to this community college has been enthusiastic; in September of 1965, 1,215 students were registered, by September 1966 enrollments should approximate 1,600.

Mesa Community College: The Maricopa County Junior College District opened Mesa Community College, in rented buildings, in September of 1965. The college is now located on a 120-acre site near Mesa which has been master-planned for 5,000 students. September enrollment in 1965 was 1,369 students; by September 1966 this is estimated to reach 2,800.

Glendale Community College: This college, also operated by the Maricopa County Junior College District, opened in rented facilities in September, 1965. The present location of the college is a 120-acre site in Glendale which has also been master-planned for 5,000 students. Enrollments in September of 1965 were 1,969; expected enrolment in 1966 is 3,300.

Privately Supported Colleges

Colleges supported by other than state funds are relative newcomers to higher education in Arizona. Two such institutions are now operating and another plans to open shortly. Only institutions which are accredited by recognized regional or national accrediting associations are included in this group.

American Institute for Foreign Trade: The Institute was chartered as a non-profit Arizona corporation on April 18, 1946. In June of that year a site was acquired near Phoenix from the War Assets Administration. A capital fund was made available by five banks and the directors of the Institute. Doors were opened to students October 1, 1946 and the first class graduated in June, 1947. A three-part curriculum was developed, which has since undergone no important structural change. Students train in the practical techniques of international commerce, in active speaking command of at least one major foreign language, and in general knowledge of selected world areas and their peoples. Degrees of Bachelor of Foreign Trade and Master of Foreign Trade are awarded. The enrollment at this institution in 1965 was 315; 345 are expected in 1966.

Grand Canyon College: The first steps toward founding this college were taken at the Baptist General Convention of Arizona in 1946. On March 4, 1947 college trustees chose Prescott as the site and Grand Canyon College as the name. The college was chartered on August 1, 1949 and opened its doors to students in the fall of that year. In September 1951 the college moved to a newly constructed campus on West Camelback Road in Phoenix. The college is owned and operated by the Arizona Southern Baptist Convention. Bachelor of Arts and Bachelor of Science degrees are offered in selected fields. Enrollment reached 540 students in September of 1965 and this fall 580 are anticipated.

Prescott College: Plans have been made to open this college in September of 1966. A catalog for the 1966-67 academic year has been published. Prescott College is to be a co-educational liberal arts college offering a full academic spectrum in humanities, natural sciences and social sciences. The feasibility study was done by the national organization of the Congregational Churches. A Ford Foundation grant supported a symposium to establish the principles of the curriculum of the college which is based upon study in depth of one of the world's civilizations including its art, technology, science, and social institutions. The curriculum also includes general study of western civilization and a major in a field such as anthropology, chemistry, mathematics, psychology, and so on. One hundred and thirty students are expected for the opening class of 1966.

Structure of the Junior College System

An understanding of two different, but compatible, structures is necessary before Arizona's junior college system can be fully comprehended. The first is at the state level and the second is at the county level.

The State Level: A seventeen-member State Board of Directors for Junior Colleges is established under the provisions of the law (Sec. 15-656, A.R.S.). One member is appointed by the governor from each of the state's fourteen counties. The three remaining members are representatives of the Board of Regents of the State Universities, the State Superintendent of

Public Instruction, and the Director of the Division of Vocational Education.

The State Board appoints an Executive Director to serve as an adviser to the Board, a coordinator of the entire system, and a director of a continuing series of studies for the purpose of identifying needed legislation.

The specific responsibilities of the State Board according to the law (Sec. 15-660, A.R.S.) are the following:

1) Enact ordinances for the government of the institutions under its jurisdiction.
2) Set standards for the establishment, development, administration, operation and accreditation of junior colleges.
3) Permit and arrange for certification of experienced and qualified community leaders in business, the professions and the arts, for the purpose of teaching classes at a junior college in fields of their specific competence.
4) Establish qualifications of the instructional staff and establish standards of vocational competence required to instruct in occupational as well as academic subjects.
5) Fix tuitions and fees to be charged and graduate the tuitions and fees between institutions and between residents, non-residents, and students from foreign countries.
6) Establish curriculums and designate courses at the several institutions which in its judgment will best serve the interest of the state.
7) Fix and collect fees for issuance and renewal of certificates. All fees shall be deposited with the state treasurer in a special fund, designated the "certification fund" to be used for the purpose of defraying the costs of certification.

The County Level: A five-member governing board is established under provisions of the law (Sec. 15-676.01, A.R.S.). Members of the county board, representing precincts established by the state board, are elected by the qualified electors.

In keeping with its general responsibility of administering a county's junior college, the governing board appoints a president who, in turn, recommends the appointment of the other members of the staff. The typical administrative staff consists of specialists in the areas of instruction, student personnel work, and business affairs.

The specific duties of the county governing board are the following:

1) Maintain the junior college for a period of not less than eight months in each year, and if the funds of the district are sufficient, maintain the college for a longer period.
2) Enforce the courses of study and the use of textbooks prescribed and adopted by the state board.
3) Visit the junior college and examine carefully into its management, conditions, and needs.
4) Exclude from the college all books, publications or papers of a sectarian, partisan, or denominational character intended for use as textbooks.
5) Appoint and employ a president or presidents, vice presidents, deans, professors, instructors, lecturers, fellows, and such other officers and employees it deems necessary.
6) Determine the salaries of persons appointed and employed.
7) Remove any officer or employee when in its judgment the interests of education in the state so require.
8) Award degrees, certificates, and diplomas upon the completion of such courses and curriculum as it deems appropriate.

Purpose: The purpose of Arizona's junior colleges is to provide in their respective counties continuing educational opportunity to all men and women beyond high school age. A comprehensive program is necessitated by open door admission policies.

The following programs are required by the State Board of

Directors of Junior Colleges and found at least to some degree at all of the institutions:

1) General education for all full-time students.
2) Courses equivalent to those taken in freshman and sophomore years of the university.
3) Vocational-technical and semi-professional programs suited to Arizona's economy and the general needs of the nation.
4) Educational opportunity for all adults capable of profiting from training and study beyond the high school.
5) Service and cultural programs to enrich the cultural life of the citizens.
6) Academic and occupational counseling with job placement services.

Programs

Junior college programs can be classified according to whether they are terminal or transfer, although a clear-cut distinction is not always possible. In the case of home economics for example, curricula are often available for both students interested in homemaking and professional home economists who will transfer to baccalaureate-granting institutions. A number of courses for both these curricula may be identical, but transfer programs will include college and university requisites as well. There are other such examples of flexibility in junior college curricula, but in general, terminal curricula lead directly toward employment whereas transfer curricula represent the first two years of a four-or five-year program leading to a bachelor's degree.

In addition to their transfer curricula, which require the offering of English, social sciences, physical and natural sciences as well as other required courses for baccalaureate programs, the junior colleges of Arizona offer a number of terminal career-oriented programs for students not seeking a bachelor's degree. These programs generally take two forms: curricula leading to an associate degree and vocational curricula which do not lead to a degree but are intended to train students in such vocational skills as data processing and electronics.

Programs of Individual Colleges

Arizona Western College

Founded: 1962
Member of junior college system, 1963
Enrollment: 1,670 (September, 1965)
Buildings: 21 and 3 dormitories

In addition to transfer curricula the following list of terminal programs represents the 1965-66 offerings of Arizona Western College as set forth in its catalogue.

Advertising Art
Agricultural Business Management
Automotive Technology
Child Care
Citrus Fruit Management
Civil Engineering
Data Processing
Drafting Technology
Electronic Engineering
Electronics Technology
Engineering Technology
General Agricultural Production
General Business
Home Economics, occupational
Industrial Technology
Mid-Management
Office Administration
Office Services
Ornamental Horticulture
Surveying Technology
Vocational Automotive
Vocational Drafting

Cochise College

Founded: 1964
Member of junior college system, 1964
Enrollment: 1,215 (September, 1965)
Buildings: 12 and 2 dormitories

Cochise College (cont.)

The following terminal programs are offered in addition to transfer curricula.

- Civil Technology
- Drafting Technology
- Law Enforcement
- Middle Management
- Practical Nursing
- Secretarial Studies

Eastern Arizona College

Founded: 1888
Became member of present junior college system, 1962
Enrollment: 890 (September, 1965)
Buildings: 12 and 3 dormitories

Eastern Arizona College offers both transfer and terminal curricula. The following terminal programs are offered.

- Agricultural Business
- Agricultural Mechanics Technology
- Auto-Business
- Automotive Mechanics
- Automotive Technology
- Data Processing
- Drafting Technology
- General Business
- Home Economics, occupational
- Industrial Technology
- Mechanical Engineering Technology
- Mid-Management
- Pre-Medicine and Related Fields
- Production Agriculture
- Professional Agriculture
- Secretarial and Homemaking
- Secretarial Training

Maricopa County Junior College District

Founded: 1963
Member of junior college system, 1963

The Maricopa District includes the following.

Phoenix College

Founded: 1920
Member of junior college system, 1963
Enrollment: 12,756 (September, 1965)
Buildings: 15 permanent buildings

Glendale Community College

Founded: 1965
Member of junior college system, 1965
Enrollment: 1,969 (September, 1965)
Buildings: 11

Mesa Community College

Founded: 1965
Member of junior college system, 1965
Enrollment: 1,369 (September, 1965)
Buildings: 3 permanent and 30 portables

Maricopa County junior colleges offer, in addition to transfer curricula, the following terminal programs.

Art (General)
Child Study Center
Civil Engineering Technology
Clerical
Data Processing
Day Care Administration
Drafting Technology
Electronics Engineering Tech.
Fashion Design
Fire Science
Food Service Administration
General Business
Home Economics, occupational
Medical Receptionist
Mid-Management
Nursing (Practical)
Photography
Police Science
Real Estate
Secretarial

Structure of the Universities

There are six four-year colleges and universities in Arizona, three public and three private. This report on the four-year institutions is focused on the universities for two reasons: (1) The universities are public and subject to the wishes of the people through their representatives and (2) The universities enroll 69 percent of all higher education students in Arizona while the private colleges enroll one percent. (The junior colleges enroll the remaining 30 percent.)

Arizona's three state universities form a system administered by the Board of Regents of the Universities of Arizona, a corporation consisting of eight members appointed by the governor, the state superintendent of public instruction (ex officio member), and the governor (ex officio member). The term of office is eight years with the terms of two members expiring every odd numbered year. The officers of the Board of Regents are selected from the membership and include a president, secretary, and treasurer.

The general administrative powers of the Board of Regents according to the law (A.R.S. Sec. 15-725) are the following:

1) Enact ordinances for the government of the institutions under its jurisdiction.
2) Appoint and employ a president or presidents, vice presidents, deans, professors, instructors, lecturers, fellows, and such other officers and employees it deems necessary.
3) Determine the salaries of persons appointed and employed.
4) Establish a retirement system for any institution under its jurisdiction.
5) Remove any officer or employee when in its judgment the interests of education in the state so require.
6) Fix tuitions and fees to be charged and graduate the tuitions and fees between the institutions and between residents, non-residents, and students from foreign countries.
7) Establish curriculum and designate courses at the several institutions which in its judgment will best serve the interests of the state.
8) Award such degrees and diplomas upon the completion of such courses and curriculum requirements as it deems appropriate.

Administrative Structure

The administrative organization varies somewhat between the three universities due mainly to the differences in sizes and numbers of colleges. Basically, each university is administered by a president, vice presidents or executives of similar rank but different titles, and academic deans. Additional administrative staff members are added as the number of students and services increases.

Committees are widely used to increase the opportunity for students and faculty members to participate in the administration of the institution. Such participation not only improves the quality of communications and decisions, it also furthers the social purposes of education.

A brief statistical overview of each university is included at the end of this chapter. These sketches serve to add perspective to comments about structure.

Purposes of the Universities

The stated purposes of Arizona's universities may be summarized as follows:

1) To establish and maintain the highest standards of quality in the fields of teaching, research, and service now authorized, or to be authorized in the future for the people of the State of Arizona.
2) To stimulate, encourage and focus scholarly attention on the development and nurturing of the special assets and requirements of Arizona.
3) To secure and maintain a distinguished faculty and staff in order to render superior educational service to students.
4) To educate for leadership and responsible citizenship.
5) To be actively engaged in the search for truth and the extension of knowledge.

Characteristics of the Universities

Arizona State University

Founded: 1885
Enrollment: 19,198 (September, 1965)

Arizona State University (cont.)

Colleges: Architecture, Business Administration, Education, Engineering Sciences, Fine Arts, Law, Liberal Arts, Nursing, and the Graduate College.

Schools: The Graduate School of Social Service Administration

Divisions: Audiovisual Center, Bureau of Broadcasting, Bureau of Business Research and Services, Computer Center, Data Processing Center, Bureau of Educational Research, and Services, Bureau of Government Research, Laboratory for Meteoritic Research, News Bureau, Placement Center, Poisonous Animals Research Laboratory, Bureau of Publications, Student Health Center, University Testing Service, Center for Higher Education, Center for American Studies, Center for Latin American Studies, Center for Asian Studies, Extension Division, Summer Session, Center for the Study of Urban Systems, Indian Education Center, Engineering Research Center, Collection of American Art.

Major Fields of Study[1]

Agriculture:

Agricultural Business
Agricultural Economics
Agricultural Education
Animal Science and Plant Science
Foreign Agricultural Service
Special Programs in Agriculture
Pre-Veterinary
Agricultural Production and Management
Agricultural Science
Pre-Forestry

Architecture:

Business Administration:

Accounting
Advertising
Economics
Finance
General Business Administration
Insurance
Management
Marketing
Office Administration
Pre-Law
Real Estate
Special Secretarial Program

Arizona State University (cont.)

Education:

- Art
- Biological Sciences
- Business
- Choral Music
- Distributive Education
- Double Music Major
- English
- French
- General Science
- Geography
- Geology
- German
- Health Education
- History
- Home Economics
- Industrial Arts
- Instrumental Music
- Journalism
- Library Science
- Mathematics
- Physical Education
- Physics
- Political Science
- Russian
- Spanish
- Speech and Dramatics

Special Programs in Education:

- Teaching the Hearing Handicapped Child
- Teaching Indian Children

Engineering:

- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Engineering Science
- Industrial Engineering
- Mechanical Engineering

Fine Arts:

Art, Drama, Music, Speech, Speech Correction

Industrial Design and Technology:

- Aeronautical Technology
- Communications Technology
- Design Technology
- Electronics Technology
- Graphic Arts Technology
- Tool and Manufacturing Technology
- Welding Technology

Arizona State Universiey (cont.)

Liberal Arts:

- Anthropology
- Art
- Biology
- Botany
- Boys Club Administration
- Chemistry
- Drama
- Economics
- English
- Entomology
- French
- Geography
- Geology
- German
- Health Education
- History
- Home Economics
- Humanities
- Journalism
- Mathematics
- Medical Technology
- Microbiology
- Music
- Philosophy
- Physical Education
- Physics
- Political Science
- Psychology
- Radio-Television
- Recreation
- Russian
- Sociology
- Spanish
- Speech
- Wildlife Biology
- X-ray Technology
- Zoology

Special Programs in Liberal Arts:

- American Studies
- Bilingual Secretarial
- Foreign Service Training
- Latin American Area Studies
- Non-Western Studies
- Pre-Dental
- Pre-Law
- Pre-Ministerial
- Pre-Occupational
- Pre-Optometry
- Pre-Osteopathy
- Pre-Pharmacy
- Pre-Physical Therapy
- Public Service Training

Nursing:

Northern Arizona University

Founded: 1899

Enrollment: 5,260 (September, 1965)

Colleges: Arts and Sciences, Business Administration, Creative Arts and Education.

Schools: Applied Science and Technology, Forestry, and Graduate Study.

Northern Arizona University (cont.)

Divisions: The Summer Session, Division of Extended Services, Placement Bureau.

Major Fields of Study: (see footnote[1])

- Arts and Sciences:
  - Anthropology
  - Biology
  - Biology Education
  - Botany
  - Botany Education
  - Chemistry
  - Chemistry Education
  - Creative Writing
  - Earth Science
  - Earth Science Education
  - English
  - English Education
  - French
  - French Education
  - Geology
  - Geography
  - History
  - History Education
  - Mathematics
  - Mathematics Education
  - Medical-Dental Lab. Tech.
  - Nursing
  - Physical Science
  - Physical Science Education
  - Physics
  - Physics Education
  - Police Science
  - Political Science
  - Pre-Dentistry
  - Dentistry-Biology
  - Dentistry-Chemistry
  - Pre-Law
  - Pre-Medicine
  - Medicine-Biology
  - Medicine-Chemistry
  - Pre-Veterinary
  - Veterinary-Chemistry
  - Veterinary-Biology
  - Recreation-Land Mgmt.
  - Spanish
  - Spanish Education
  - Social Science
  - Social Science Education
  - Sociology
  - Zoology
  - Zoology Education
- Business Administration:
  - Accounting
  - Business Education
  - Data Processing
  - Economics
  - Finance
  - General Management
  - Marketing
  - Personnel Management
  - Production Management
  - Secretarial Studies
- Creative Arts:
  - Art
  - Art Education
  - Drama-Speech
  - Music Education
  - News-Editorial
  - Newspaper Mgmt.-Advertising

Northern Arizona University (cont.)
- Drama-Speech-English Educ.
- Radio
- Music
- Public Relations
- Philosophy
- Humanities

Education:
- Elementary Education
- Physical Education (Men)
- Physical Education (Women)
- Psychology
- Recreational Leadership

School of Forestry:
- Forest Management
- Forest Recreation
- Forest Utilization

School of Applied Science and Technology:

Home Economics
- Dietetics
- Food and Nutrition
- General Home Economics
- Home Economics in Business
- Home Economics in Business Extended
- Home Economics Education
- Home Economics Education Extended
- Home Economics
- Interior Design
- Textiles and Clothing

Industrial Arts Education (Teaching)
- General Major
- Extended Woods
- Extended Metals
- Extended Elec-Electronics
- Extended Drafting
- Extended Arts and Crafts
- Extended Combination
- Manual Arts Therapy
- Vocational-Technical Teacher Education

Northern Arizona University (cont.)

Technical Majors

- Architecture
- Engineering
- Aero-Space
- Chemical
- Civil
- Electrical-Electronics
- Mechanical
- Science
- Engineering and Mathematics
- Other

Technology

- Civil
- Drafting
- Electronics
- Mechanical
- Industrial: Management Option

Graduate College:

- Biology
- Curriculum (Education)
- Elementary Education
- Elementary Principal (Education)
- English
- Guidance and Counseling
- History
- Home Economics Education
- Industrial Education
- Junior College Instruction
- Mathematics
- Physical Education
- Secondary Education
- Secondary Principal (Education)
- Special Education
- Superintendent (Education)
- Teaching of Art
- Teaching of Biology

Teaching of Business
Teaching of Chemistry
Teaching of English
Teaching of Mathematics
Teaching of Music
Teaching of Physical Science
Teaching of Social Science
Teaching of Spanish

University of Arizona

Founded: 1885

Enrollment: 20,361 (September, 1965)

Colleges: Agriculture, Architecture, Business and Public Administration, Education, Engineering, Fine Arts, Law, Liberal Arts, Medicine, Mines, Nursing, Pharmacy, and the Graduate College.

Schools: Home Economics, Music.

General Departments: Health, Physical Education and Recreation; Women's Physical Education; School of Military Science and Areospace Studies; and Continuing Education and the Summer Session.

Divisions: Agricultural Experiment Station, Agricultural Extension Service, Applied Research Laboratory, Arid Lands Research, Arizona Bureau of Mines, Arizona Cooperative Fishery Unit, Arizona Cooperative Wildlife Research Unit, Arizona Poisoning Control Information Center, Arizona State Museum, Arizona Transportation and Traffic Institute, Bureau of Audiovisual Services, Bureau of Correspondence Instruction, Bureau of Educational Research and Service, Bureau of Ethnic Research, Division of Research, College of Business and Public Administration, Engineering Experiment Station, Geochronology Laboratories, Institute of Atmospheric Physics (including Solar Energy Research Laboratory), Institute of Government Research, Institute of Water Utilization, Laboratory of Tree-Ring Research, Lunar and Planetary Labora-

University of Arizona (cont.)

tory, Numerical Analysis Laboratory, Radio-Television Bureau, Steward Observatory, University Art Gallery, University Rehabilitation Center, Water Resources Research Center.

Major Fields of Study: (see footnote [1])

Agriculture:
- Agriculture, General
- Agricultural Biochemistry
- Agricultural Business
- Agricultural Chemistry & Soils
- Agricultural Economics
- Agricultural Education
- Agricultural Journalism
- Agricultural Research
- Agronomy
- Animal Breeding
- Animal Science
- Dairy Science
- Entomology
- Farm Mechanization
- Horticulture
- Plant Breeding
- Plant Pathology
- Plant Science
- Poultry Science
- Range Management
- Watershed Management
- Pre-Veterinary

Home Economics:
- Apparel Design
- Child Development Family Relations
- Clothing and Textiles
- Consumer Service Food
- Family Economics Research
- Food and Nutrition
- Home Economics, General
- Home Economics Education

University of Arizona (cont.)

- Home Economics Journalism
- Human Nutrition Research
- Interior Design
- Merchandising and Fashion Promotion
- Nutrition Research
- Restaurant Management
- Textiles

Architecture:

Business Administration:

- Accounting
- Area Development
- Business Administration
- Business Economics
- Business Education
- Correctional Administration
- Health Services Administration
- Finance
- Geography
- Government Service
- Industrial and Labor Relations
- Insurance
- Law Enforcement Administration
- Management
- Marketing
- Production Management
- Public Administration
- Public Recreation Administration
- Real Estate
- Office Administration
- Social Studies
- Social Administration
- Transportation & Public Utilities
- Sociology

Education:

- Early Childhood
- Education Administration
- Education, General
- Education, Guidance
- Education Psychology
- Elementary Education
- Health Education
- History and Philosophy
- Library Science
- Measurement and Research
- Physical Education—Men
- Physical Education — Women
- Reading
- Rehabilitation Counseling

University of Arizona (cont.)

- Secondary Education
- Science Teaching
- Special Education
- Student Personnel in Higher Education

Engineering:

- Aerospace Engineering
- Agricultural Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Engineering Mathematics
- Engineering Mechanics
- Engineering Physics
- Materials Engineering
- Mechanical Engineering
- Nuclear Engineering
- Systems Engineering

Fine Arts and School of Music:

- Art
- Drama
- Dramatic Literature
- Music
- Musical Arts
- Speech

Law:

Liberal Arts:

- Actuarial Mathematics
- Anthropology
- Astronomy
- Biology
- Botany
- Chemistry
- Classics
- Economics
- English
- Entomology
- Fishery Management
- Foreign Service
- French
- General Studies
- Genetics
- Geography
- Geology
- German
- Government
- History
- Journalism
- Latin American Studies
- Mathematics
- Medical Technology
- Meteorology
- Microbiology
- Oriental Studies
- Philosophy
- Physics
- Psychology
- Romance Languages
- Russian
- Sociology
- Spanish
- Statistics
- Wildlife Management
- Zoology

University of Arizona (cont.)

Special Programs:

- Pre-Dentistry
- Pre-Dental Hygiene
- Pre-Education
- Pre-Law
- Pre-Medicine
- Pre-Optometry
- Pre-Pharmacy
- Foreign Service

Nursing:

Mines:

- Earth Sciences
- Geological Engineering
- Geology
- Metallurgical Engineering
- Metallurgy
- Mining Engineering
- Hydrology

Pharmacy:

General Majors:

- Geochronology
- Geophysics-Geochemistry
- Physical Education
- Health Education
- Recreation
- Statistics
- Genetics

Characteristics of the Private Colleges

Grand Canyon College

Founded: 1946
Enrollment: 540 (September, 1965)

Bachelor of Arts and Bachelor of Science degrees are awarded in the following major fields:

- Behavioral Sciences
- Biology
- Business
- Elementary Education
- English
- English (Creative Writing and teaching of Creative Writing)
- History
- Mathematics
- Music
- Music Education
- Physical Education
- Religion
- Secondary Education
- Secretarial
- Social Studies

The American Institute for Foreign Trade

Founded: 1946
Enrollment: 315 (September, 1965)

The objective of this institution is "to prepare men and women of widely varied backgrounds and professional interests for active careers in international affairs."[2] It awards a Bachelor of Foreign Trade degree to holders of Bachelor of Arts or Bachelor of Science degrees upon completion of a fifth year. It also awards a Master of Foregin Trade upon the completion of 64 semester hours of work (including the Bachelor of Foreign Trade) beyond the baccalaureate degree.

* * * * *

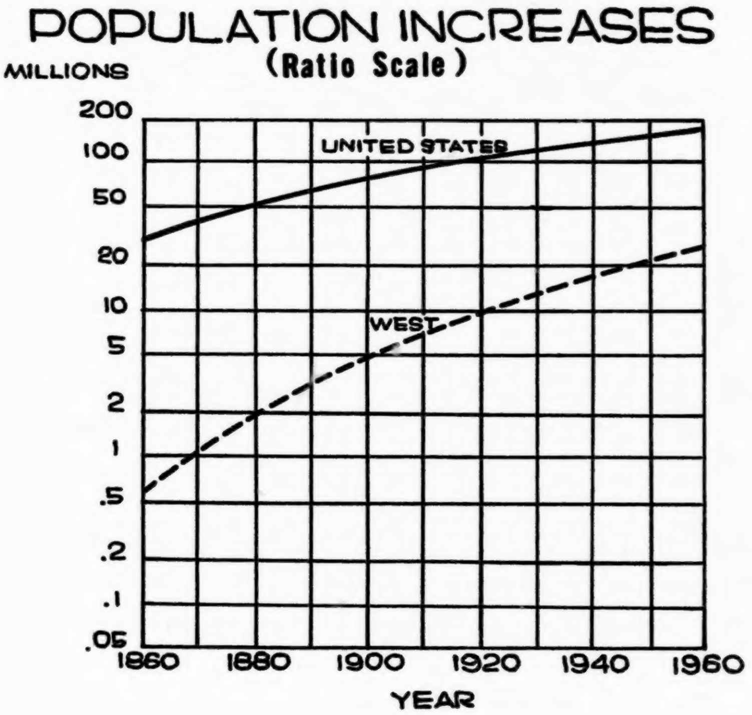
With this structure of higher education in the State of Arizona in mind, it is appropriate to next examine the resources of higher education and some of the factors bearing upon their development.

CHAPTER III

Growth and Resources of Higher Education in Arizona

The West grows faster than the nation. Since 1890 each census has shown a faster rate of growth for the West than the nation as a whole. In the decade between 1950 and 1960 the population of the West increased by approximately eight million. This is numerically a larger increase than the Northeastern, the Northcentral, or the Southern regions experienced individually, and it is more than double the rate of growth for the rest of the nation.

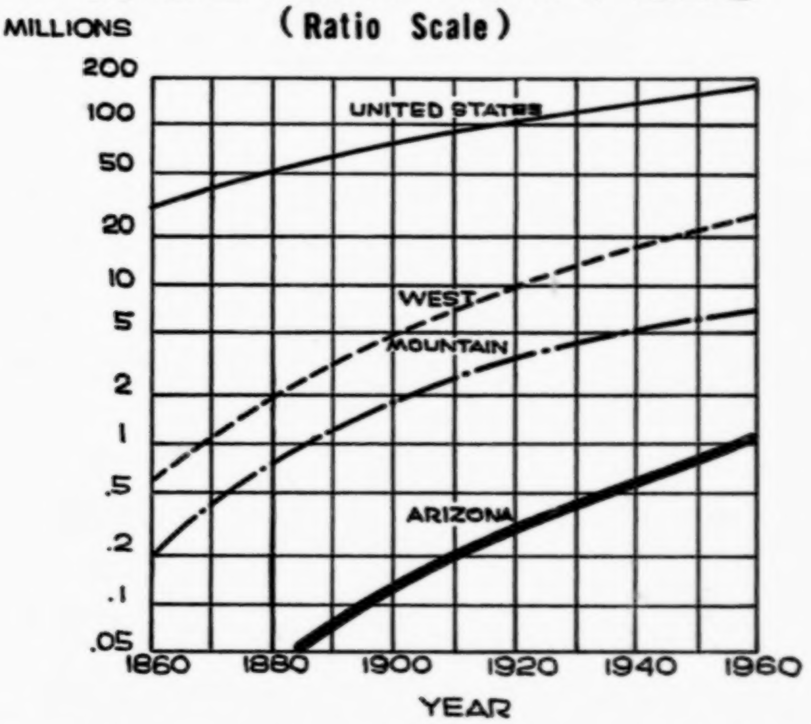
FIGURE 3



Arizona in turn grows faster than the West and the Mountain Region.[1] Between 1950 and 1960 the census showed a faster rate of growth for Arizona than either the West or the Mountain Region

FIGURE 4

POPULATION INCREASES



Particularly since World War II, this rate has accelerated until Arizona now ranks fourth among all the states in rate of population growth, exceeded at the last census only by Alaska, Nevada, and Florida. Between 1940 and 1950 Arizona's population increased 50.1 percent; the national increase was 14.5 percent. Between 1950 and 1960 it increased 73.7 per cent; the national increase during this decade was 18.5 percent. In 1960 the population of Arizona was by actual count 1,302,161, a numerical increase of more than half a million over 1950.

Two factors are responsible for the rapid increase in Arizona's population: a considerable excess of births over deaths, and a very high rate of in-migration.

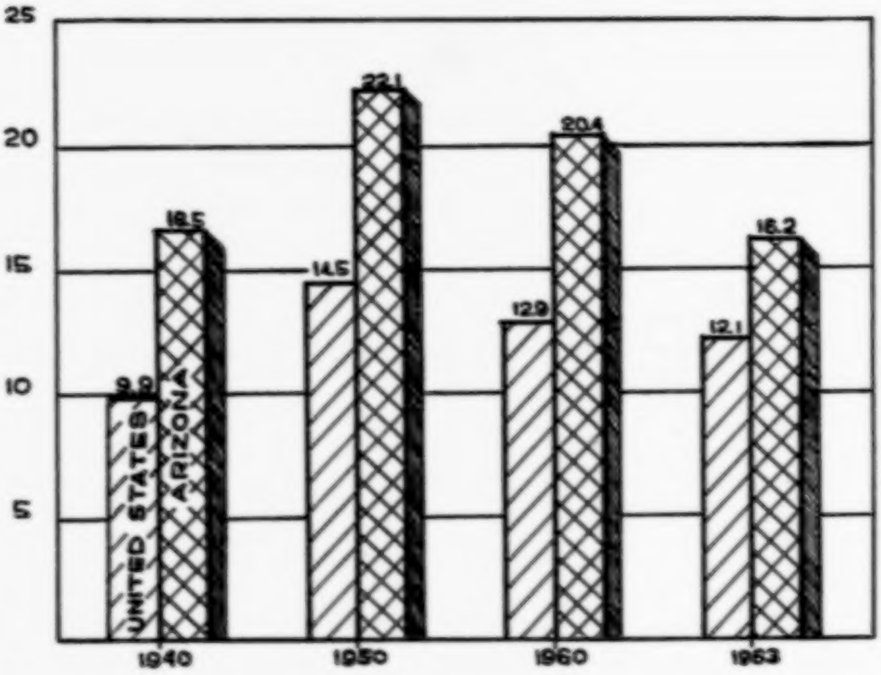
Natural Increase

Arizona has a higher rate of natural increase than the United States. Natural increase is the difference between births and deaths. Arizona has a lower death rate than the nation; at the same time its birth rate is higher than the national average. Consequently, the rate of natural increase for this state is considerably higher than the national rate. In the year 1960 for example, there was a natural increase for the United States as a whole of approximately thirteen people for each one thousand of population. The increase for Arizona was approximately twenty for each one thousand of population.

It can be noted in the graph below that some leveling off from the high rate of natural increase reached in 1950 has occurred so that the rate for 1963 has dropped to the pre World War II rate. This is still, however, significantly higher than the

FIGURE 5

RATES OF NATURAL INCREASE



national rate. It is possible that the rate will turn upward starting in 1966. For beginning in 1965 those children born immediately after World War II reached marriageable ages and began contributing to population increases within the state. A modification of this upward turn may result from wider use of new techniques for birth control. How pronounced the effects of these techniques will be is difficult to estimate. Their impact in terms of higher education will not be fully felt for another eighteen to twenty years and consequently consideration of them is not necessary for the span covered by this report.

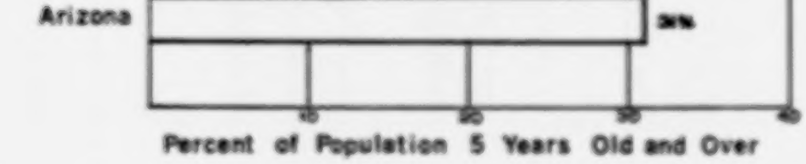
Between 1950 and 1960 the population of Arizona increased at an average rate of 5.5 percent annually; natural increase accounted for only about 2 percent of the state's annual population increase. The other 3.5 percent increase resulted from a high level of in-migration.

Increase from In-Migration

In-migration rates are much higher for Arizona than for the West, the Mountain States or the nation. In the last ten years, the greatest portion of Arizona's increase in population was a result of in-migration. During the year 1962, in-migration

FIGURE 6

PERCENTAGES OF 1960 POPULATION LIVING
IN DIFFERENT STATES IN 1955



Source: 1960 Census of Population, Vol. 1, Part 4, Page IX accounted for about 50,000 new residents while the natural increase was about half of that figure or approximately 26,000. In-migration varies greatly from year to year. It has increased from an average of less than 30,000 annually in the early fifties, to an average of over 50,000 annually in the years since 1957.[2]

The population of Arizona is younger than the nation as a whole. In Arizona, contrary to popular opinion, the population has tended to be a young one. This is true not only of established residents but of newly arriving residents.

At the time of the 1960 census, only eight states had a lower median age than Arizona. Despite a heavy influx of retired people, this older group has been more than balanced by younger people attracted to the West. These new residents are concentrated primarily in two age groups: the first group between the ages of twenty and forty, and the second, the children of this first group, primarily in the ages below ten. As a rule Arizona in-migrants are still concentrated in the ages below forty as they have been since territorial days.[3] The following table demonstrates the proportions of the Arizona population in each of the age groups.

TABLE 3
PERCENTAGE DISTRIBUTION OF POPULATION BY AGE ARIZONA AND UNITED STATES
1950-1960

Age Group	Percentage 1950	In-Migrants at Time of Arrival	Percentage 1960	Percentage United States 1960
9 and under	23.1%	25.7%	24.3%	22.4%
10-19	16.9	12.2	18.1	17.3
20-39	30.5	32.4	26.8	25.5
40-59	20.5	19.6	20.9	22.6
60 and over	9.1	10.1	9.8	12.1
	100.0%	100.0%	100.0%	100.0%

Source: *Economy of Arizona*

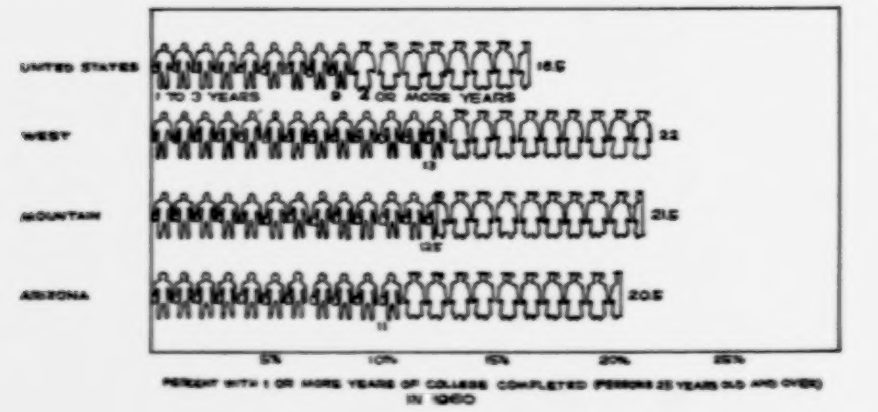
Those children born to Arizona residents who arrived just after World War II have now entered the 18-21 year group and are either in college or beginning to contribute heavily to an increasing annual number of births. Occasionally they are doing both. Add to this the fact that in-migrants are also a young group with strong college aspirations who when they marry will have high reproductive potential, and the enrollment and population increases Arizona faces become apparent.

Enrollments in Higher Education in Arizona

To summarize the foregoing, on the average Arizona's is a young population, younger than the nation as a whole. Because it is a relatively young population, the college age group in Arizona represents a larger percentage of the total population than will be average for the nation. Partially because it has a larger percentage of college age youths and partially because the educational aspirations of Arizonans are high, a greater percentage of this state's residents seek a college education than do so nationally. In 1960 for example, slightly over 20 percent of the population of Arizona had one or more years of college education while the nation as a whole had 16.5 percent as illustrated in the graph below.

FIGURE 7

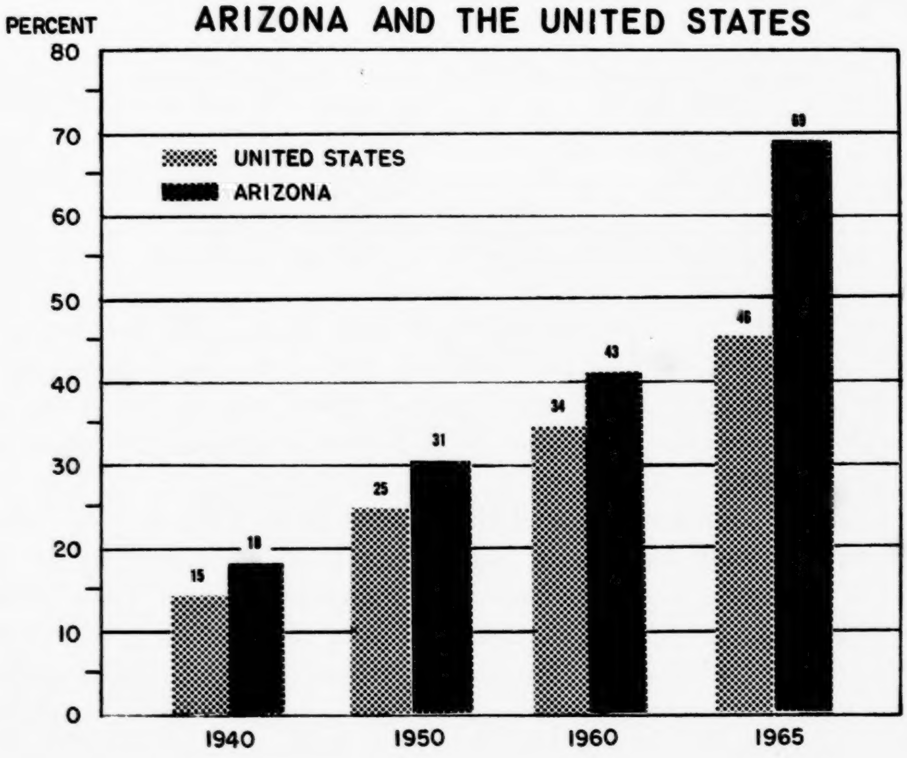
PROPORTIONS OF ADULTS WHO HAVE ATTENDED COLLEGE



This can further be illustrated by comparing with national percentages the enrollments in Arizona as a percentage of the 18-21 year olds in the state.

FIGURE 8

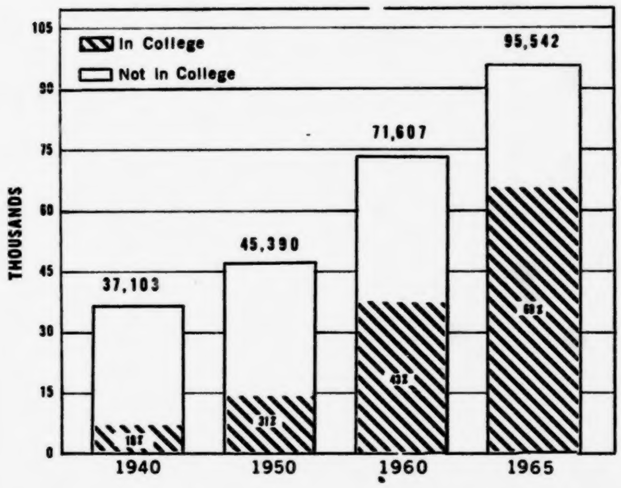
COLLEGE ENROLLMENTS AS A PERCENTAGE OF THE 18 TO 21 AGE GROUP
ARIZONA AND THE UNITED STATES



Two major variables are evident in the growth of college enrollments as a percentage of the 18-21 year population. The first is the pronounced increase in the size of the population, and the second is the growing percentage of the group representing college enrollments. The following figure demonstrates the past and current interrelations of these two variables. Increases in the height of bar indicates the increasing size of the group. The increasing proportion of the college attending group is shown by the shaded portion of the bar.

FIGURE 9

COLLEGE ENROLLMENT IN ARIZONA AS A PERCENTAGE OF 18-21 YEAR OLDS



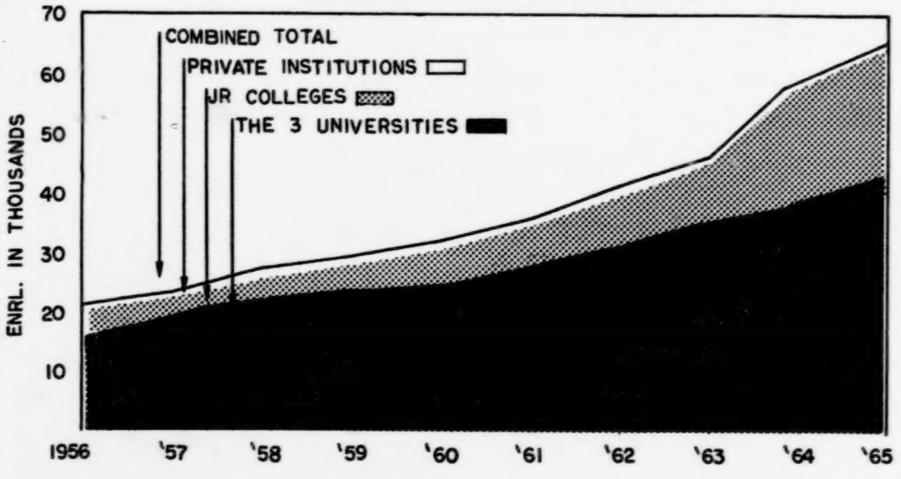
It can be noted in Figure 9 that during the twenty-year period between 1940 and 1960 the size of the bar representing college age population has almost doubled and in the five-year period between 1960 and 1965 it has increased by another 33 percent.

The increasing size of the shaded portion of the bar indicates that enrollments in higher education as a percentage of the college age group have also increased sharply since 1940 when only 18 percent of the 18-21 year olds constituted enrollments in higher education within Arizona. In the twenty years between 1940 and 1960 this percentage has almost tripled, having grown from 18 to 43 percent. Between 1960 and 1965 it increased another 26 points to bring the total to 69 percent. In the five-year period between 1960 and 1965 the average increase in the percentage that college enrollments are of the college age group has been 5 percent a year. In the twenty-five year period between 1940 and 1965 the average annual increase has been about 2 percent.

An increasing college age population and a rising percentage of 18-21 year olds on the campuses have produced the growth of enrollments in higher education in Arizona over the last ten years shown in Figure 10.

FIGURE 10

ENROLLMENT GROWTH IN HIGHER EDUCATION IN ARIZONA — 1956 TO 1965



In September of 1965, sixty-nine percent of the total enrollments in institutions of higher education were in the three universities; thirty percent were in six junior colleges, and one percent in the two private colleges. It is clear that higher education in this state is, except for 1 percent, public with over two-thirds of the enrollments in the universities. It can also be seen in Figure 10 that junior college enrollments surged upward considerably in 1964 and continued to climb in 1965, but at a somewhat reduced rate. The percentage of increase at the three universities was 13 percent betwen 1964 and 1965 and 3 percent for junior colleges, but during the previous year the increase was 10 percent for the universities and *81 percent for the junior colleges*. The increase in 1964 coincides with the opening of Cochise, Glendale and Mesa Colleges. These openings almost doubled junior college enrollments.

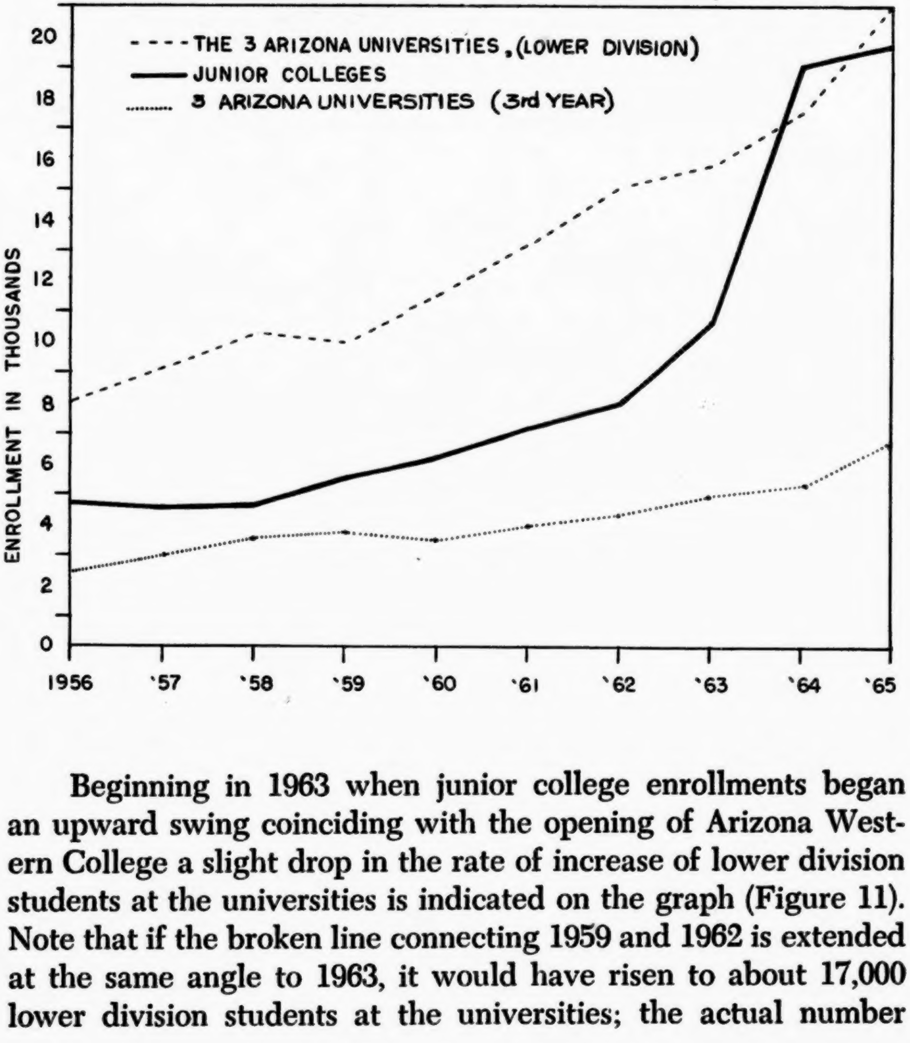
This raises the extremely interesting and significant question of the probable impact of junior colleges upon the three universities. Although it is not possible to assess this impact with complete accuracy, some general indication of impact can be arrived at for the short run.

Junior College Impact

One way to assess the impact of junior colleges upon the universities is to plot junior college enrollments against the growth of freshman and sophomore classes at the three institutions. If there was a strong impact it should certainly have become evident when four new junior colleges were added in 1963 and 1964. This comparison is plotted below.

FIGURE 11

JUNIOR COLLEGE ENROLLMENT VS. LOWER DIVISION ENROLLMENT AT ARIZONA UNIVERSITIES, 1956-1965



Beginning in 1963 when junior college enrollments began an upward swing coinciding with the opening of Arizona Western College a slight drop in the rate of increase of lower division students at the universities is indicated on the graph (Figure 11). Note that if the broken line connecting 1959 and 1962 is extended at the same angle to 1963, it would have risen to about 17,000 lower division students at the universities; the actual number was 15,938. There was therefore in 1963, according to this projection, an estimated impact of about 1,100 lower division students on the universities.

But 1963 was the year the 18-21 year group increased as a result of post World War II births; therefore the impact must have been greater than a linear projection suggests. If the angle of incline of the broken line in Figure 11 is tilted upward to allow for the increase in the 18-21 year old population and to allow for the increasing percentage of this group in college, a more accurate estimate is likely. With these two variables considered, the impact of the junior colleges on the universities in 1963 can be estimated at about 2,000 lower division students.

In 1964 the sharpest rise in junior college enrollments occurred, coinciding with the opening of Cochise, Glendale, and Mesa junior colleges. The rate of increase for lower division enrollments at the universities (the broken line in Figure 11) recovered somewhat by 1964, almost equalling the 1958 to 1962 trend. The estimated impact on university lower division enrollments by 1964 is approximately 3,500 students.

Between 1964 and 1965 both the broken line and the solid line take different angles. The universities lower division enrollment moves upward at an angle sharper than pre 1963 angles while junior college enrollments return to an angle approximating 1962 trends. This is precisely what should be expected.

When a new junior college opens in a community the initial response will be greater than the response in succeeding years. In the first year of operation many potential students are available who for one reason or another have deferred their enrollment. With this initial group enrolled, succeeding years should begin to approximate the normal rate of increase. In 1963 and 1964 four new junior colleges opened. Over these two years junior college enrollment doubled. In 1965 when no new junior colleges opened, enrollments returned to rates of increase similar to those before 1963.

Note that in 1963, and especially in 1964, the broken line does not decline at the same angle that the solid line inclines. In 1964 junior college enrollments were almost double the previous year, yet their impact on the lower division curve of the universities was less apparent than the year previously. It can be concluded from this that the largest proportion of new enrollments in junior colleges are students who would not have had the opportunity for a college education otherwise. This contention is borne out by the following analysis.

The Impact of Cochise College

For each of the two years Cochise College has been open, a measurement of its probable impact upon the University of Arizona has been made. The impact was determined by measuring the percentages of freshmen and sophomores from the graduating classes of five Cochise County high schools in 1962 and 1963. These five schools were chosen because they supplied 94 percent of Cochise College enrollments in September 1965 and represented therefore a maximum impact on the University of Arizona.

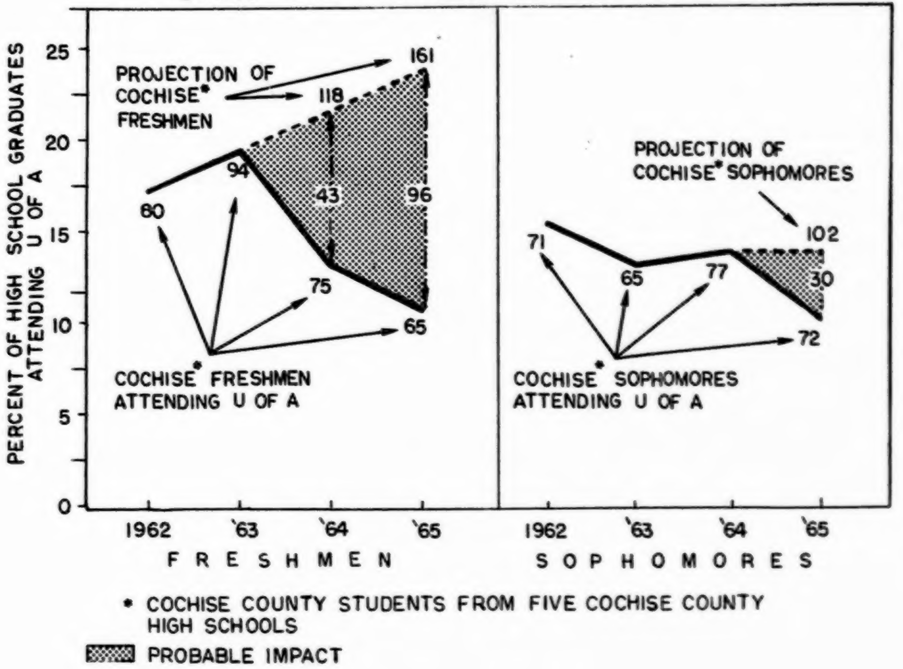
By calculating the percentages of freshmen and sophomores who had attended the university in 1962 and 1963, and by extending a trend line for these percentages to 1964 and 1965 high school classes, an estimate was made of the difference between those who did attend and those who probably would have attended the university if Cochise were not established in 1964. The method of arriving at this estimate can best be seen in Figure 12.

This approach indicates that there were 43 students in 1964, and 126 in 1965 (96 Freshmen and 30 Sophomores) graduating from five Cochise high schools and attending Cochise College who otherwise probably would have attended the University of Arizona.

There is, of course, the possibility that students from other counties attracted to Cochise College might have attended the university. A check of non-county residents attending Cochise College suggests that this would be a small number. Ninety-one out-of-county students were in attendance at Cochise College in 1965. Many of these students would in all probability have been in attendance at a junior college elsewhere if Cochise did not exist. For the sake of establishing a maximum impact let us assume one-third of these ninety would have attended the University of Arizona.

FIGURE 12

ESTIMATE OF IMPACT OF COCHISE COLLEGE UPON U OF A FRESHMEN & SOPHOMORES



We can conclude then that in 1965 approximately 156 students attended Cochise College who otherwise would have attended the University of Arizona.

It is difficult to determine the impact Cochise College has had upon Northern Arizona University and Arizona State University because data are not available for a detailed analysis. One approach is to determine the relationship between the number of Cochise county students at these two institutions and at the University of Arizona, then assume that the effect of Cochise College would be proportionately the same on the other two institutions. Arizona State University and Northern Arizona University each enrolled about two-thirds of the Cochise county students enrolled at the University of Arizona. If we assume that two-thirds of 156 was the impact of Cochise College on each of the other two institutions, the total impact was in the neighborhood of 260 students. This represents *one-half of one percent* of the total student bodies at the three institutions. The impact by this calculation has been very slight.

Yet Cochise College enrolled 1,215 students in 1965. If the impact of this institution upon the universities has been correctly estimated it can be concluded that about 950 students (or 78 percent) who enrolled at Cochise would probably not have attended any college unless a junior college was available in the community. Some of the students enrolled at Cochise are not transfer students and will terminate their educations with an associate degree; still others may not be working toward any degree. Some are adults taking advantage of the local educational opportunities most of whom will not transfer to another institution.

Summary of the Impact

The fact is inescapable, however, that a junior college in a community, because of its special programs, because of its free tuition and commuting economies, and because of its open door admissions policy, will attract a great number of students who would not otherwise attend college. This number will be far greater than the number who would have attended other institutions within the state.

One other factor enters into a consideration of the impact of the junior colleges on the universities. The dotted line at the bottom of Figure 11 shows enrollment of third year students (juniors) at the Universities. Although it is just beginning to be apparent, and will not reach full growth until 1967, an upward tilt of the dotted line is apparent in 1965. This increase will become more pronounced as enrollments at junior colleges grow larger. For as proportionately more and more students enroll in the transfer curricula of the junior colleges, the universities can anticipate greater quantities of students in their upper division programs.

In summary, then, it can be concluded that while some junior college impact is noticeable (about 15 percent of the lower division enrollments at the universities in 1965), by far the greatest effect of these institutions will be to provide college opportunities to a larger proportion of the state's population.

Educational Facilities

With the current size of enrollments in higher education set forth in the preceding pages it is pertinent to inquire into the present capabilities of the institutions to handle these enrollments. It is particularly important to review their present capacities to establish a base for enrollment and plant projections which will be presented in Chapter VI of this report.

Measures of Utilization

There are a number of different measures used for determining utilization and capacities of educational physical plants. Of the several measures that will be used in this report analyses of net assignable square feet per full time equivalent student* are perhaps the most significant indications of the adequacy of a physical plant to support a particular enrollment. This is so because all facilities of the institution enter into this calculation whereas measurements of classroom and laboratory utilization cover only from one-quarter to one-third of total space.

It cannot be implied from this that only one-quarter to one-third of an institution's space is devoted to instruction because space such as faculty and administrative offices, food service space, physical plant space and the like, are all related to instruction and combined may account for more space than classrooms and laboratories do. This is a necessary condition. Office space and other such space is inelastic, whereas classroom space is quite elastic and laboratory space somewhat elastic. By elastic is meant that increases in numbers of people do not require proportionate increases in space. The principal limitations on classroom use are the number of periods in the day and the size of the room. Thus a large sized classroom may be capable of accommodating up to 100 students a day, each of whom carries 15 hours of class work (1,500 seatings a day, 100 seatings for each of 15 periods). An office, on the other hand, can only be assigned to two or three faculty members and cannot accommodate more. As new faculty are hired new office space must be created; as new students are enrolled additional classrooms and laboratories are required only if existing ones are at capacity.

Other measures help determine the utilization of classrooms and laboratories. There are two such measures that are commonly used to determine utilization: room periods used, and percent of student stations used.

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*A student carrying 15 units as an undergraduate or 10 as a graduate.

Room period analysis tells how many periods (or hours) a week classrooms are scheduled. The greater the average number of room periods per classroom per week, the better the utilization rate is assumed to be.

As a second indication of utilization, instructional rooms can be measured in terms of the percentage of seats occupied when the room is in use. This is called the student station utilization rate. It is expressed as a percentage of the full capacity of the room. A room exactly three-quarters filled has 75 percent student station utilization. The closer the average student station utilization is to 100 percent, the better the utilization is assumed to be — up to a point. This point of saturation is determined by the rate of growth of the institution. Theoretically an institution with no enrollment growth could function at 100 percent utilization without jeopardizing its operation, but a fast-growing institution would strain its operating budget as it approached high student station utilization rates. This is the case because high student station utilization rates signify that very few seats are available in classrooms to absorb additional enrollment increases in existing classes. It means that the physical size of the classroom has begun to limit class sizes. When class sizes are limited by room sizes new sections must be formed. The formation of new class sections may require additional faculty.

The economics of this principle are obvious. At fifteen dollars a square foot for classroom construction, 30 additional stations in a lecture room at an average of 12 square feet per station cost $5,400. This, amortized over the useful life of the average academic building (50 years), is $108 per year. If in one year an additional 30 stations in a classroom will forestall the need of one new instructor the saving will be $8,392 (the difference between the salary of an instructor at $8,500 per year and the cost of the additional stations for one year). This is a one-year saving. In the long run savings would be much greater. It is apparent that allowing for additional student stations for expansion even though these are not always filled in the short run, is far less expensive in the long run than operating at high utilization rates.

The principle set forth above is highly simplified and involves other factors than those discussed here. All instruction cannot be conducted in large sections. Certain courses and certain types of learning situations require small sections. Some laboratory instruction, for example, must be done in small sections. Discussion groups are not successful if conducted with large numbers of students.

The three measures defined above applied to institutions of higher education in Arizona reveal an unusual situation, one which examined in light of the growth of enrollments over the next ten years becomes particularly significant.

Floor Space Per Full-Time Equivalent Student

It was stated at the beginning of this section that one of the most significant measures of space at an institution of higher education is the amount of net assignable square feet available for each full-time equivalent student. It is also a valuable measure because some guidelines have been developed for recommended allotments of floor space for each full-time equivalent student. The most valuable of these is set forth in the *Restudy of the Needs of Higher Education in California*. This study is based upon actual allotments in California institutions. Pertinent sections are presented in the table below.

TABLE 4

FTE Student Enrollment	Net Square Feet per Full-Time Equivalent Student	
	Colleges	Universities
2000	89.9	149.4
3000	85.0	143.7
4000	81.3	138.9
5000	78.0	135.0
6000	76.9	133.5
8000	75.2	131.1
10000	73.8	129.5
15000	70.6	124.2
20000	68.4	120.9
25000	66.6	118.7

It can be seen in Table 4 that square feet per full-time equivalent student declines as the size of the institution increases and is different for colleges and universities. Following are net square foot areas available per full time equivalent student at the Arizona institutions compared with the areas shown on the previous table.

TABLE 5

Universities	Actual	California Study
Arizona State University	68.6	120.9
Northern Arizona University	79.8	135.0
University of Arizona	66.5	120.9
Junior Colleges	**Actual**	**California Study**
Arizona Western College	82.6	89.9
Cochise College	31.9	89.9
Eastern Arizona College	113.3	89.9
Maricopa County Junior Colleges	15.3	75.2

Only one institution of the nine public institutions in the state (Maricopa County Junior College System has three institutions) presently has square foot area suitable for its enrollment according to these standards. The universities have about half of the space they require. Cochise College has less than one third of the space it requires. Arizona Western is under by 7.3 net square feet per full time equivalent student. An explanation of Maricopa County Junior Colleges net square footage per full-time equivalent student is needed. The Maricopa system at the time of the survey of its space had not yet completed the Mesa and Glendale campuses and hence was using a great deal of rented space and portable emergency buildings. Such space was not included in the calculations.

Another set of norms developed by Doi and Scott[4] in 1960 gives average square feet of floor space per full-time equivalent student in classrooms and laboratories for 68 public colleges and universities. These norms appear in Table 6 with the institution having the least square feet of classroom and laboratory space ranked in the 99th percentile, that with the most in the first percentile. The relative positions of Arizona public institutions are shown opposite the correct percentile.

TABLE 6

AVERAGE SQUARE FEET OF FLOOR SPACE PER FULL-TIME EQUIVALENT STUDENT IN GENERAL LECTURE ROOMS AND TEACHING LABORATORIES WITH RELATIVE POSITIONS OF ARIZONA'S PUBLIC INSTITUTIONS*

	General Classrooms		Laboratories	
Per-centile	Norms Sq. Ft. per FTE	Arizona Institutions Sq. Ft. per FTE	Norms Sq. Ft. per FTE	Arizona Institutions Sq. Ft. per FTE
		2.0 (Maricopa Jr.) College System)		2.3 (Maricopa Jr. College System)
99	4.9	4.9 (Univ. of Ariz.)		5.4
		7.0 (Nor. Ariz. Univ.)		
		8.5 (Ariz. State Univ.)		5.9 (Ariz. State Univ.)
		10.1 (Arizona Western)		6.8 (Cochise College)
				7.1 (Univ. of Ariz.)
				8.1 (Nor. Ariz. Univ.)
90	10.4		8.3	
		11.2 (Cochise College)		9.0 (Arizona Western)
80	12.6		9.7	
				12.5 (Eastern Ariz.)
70	14.5		13.7	
60	15.8		16.5	
		16.8 (Eastern Ariz.)		
50	17.2		21.0	
40	18.9		25.3	
30	20.8		31.3	
20	24.0		37.0	
10	31.4		48.5	
1	56.6		78.7	

*Square feet for junior colleges were estimated on the basis of 18 net sq. ft. per student station in classrooms and 25 net sq. ft. in laboratories, a fairly liberal estimate.

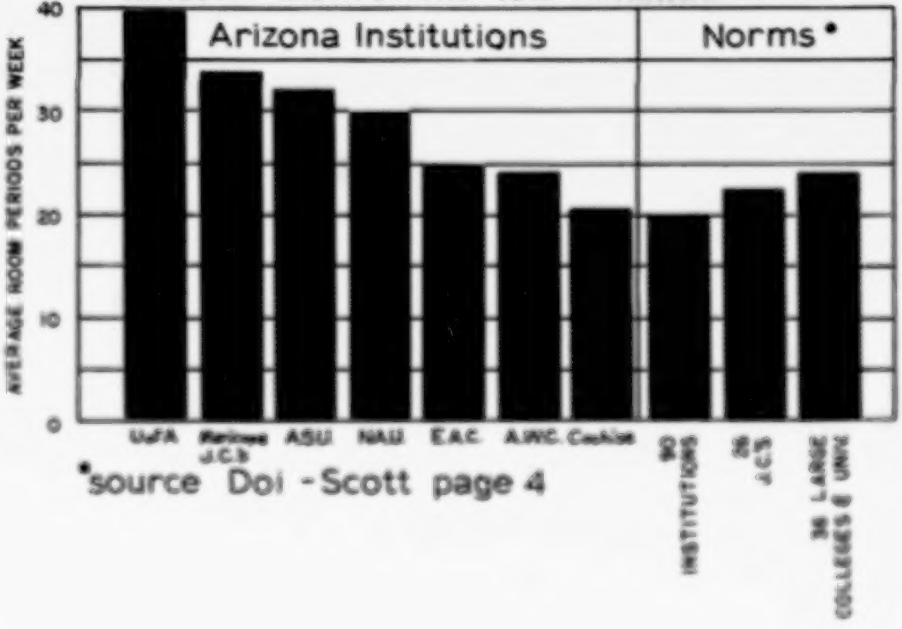
It is not possible to examine the foregoing table without concluding that square foot areas of floor space per full-time equivalent student in classrooms and laboratories at Arizona public institutions are typically much less than the average for the 68 public institutions in the Doi-Scott study.

Room Period Utilization in Lecture Rooms

With such limitations in their floor space, it can be expected that lecture room and laboratory utilization will run high at Arizona public institutions. The following table compares Arizona institutions with national averages.

FIGURE 13

ROOM PERIOD UTILIZATION OF CLASSROOMS
ARIZONA INSTITUTIONS AND NATIONAL NORMS



*source Doi -Scott page 4

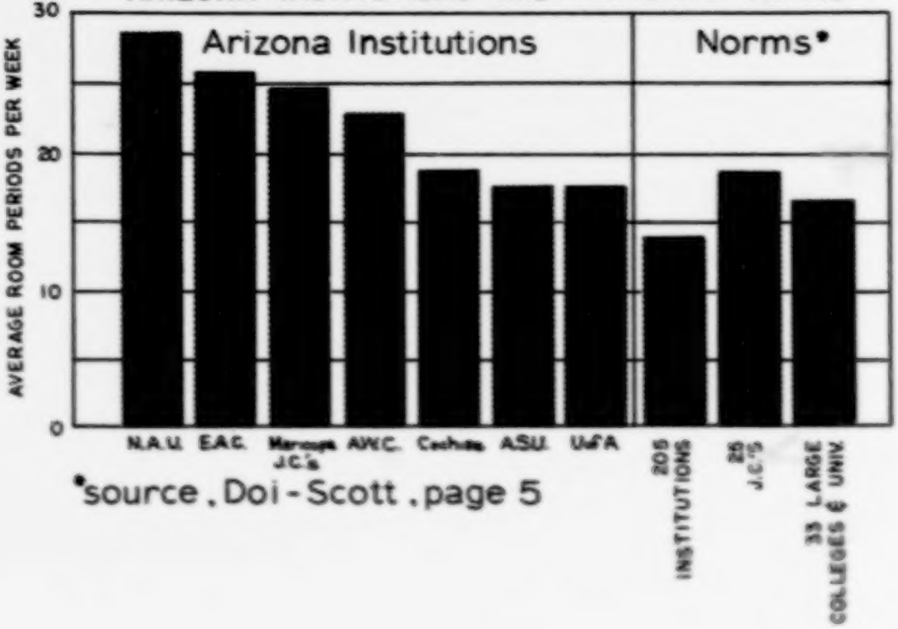
Every Arizona institution except one is above the national norm for its type, and this institution, in only the second year of its operation, consequently can be expected to equal the national average as its enrollments increase.

Room Period Utilization in Laboratories

The following table compares laboratory utilization with national norms.

FIGURE 14

ROOM PERIOD UTILIZATION OF LABORATORIES ARIZONA INSTITUTIONS AND NATIONAL NORMS



*source, Doi-Scott, page 5

All Arizona institutions either exceed or match the average laboratory utilization of the national norms.

Laboratories, because they are special purpose facilities, are not capable of the kind of utilization that general lecture rooms are. Laboratories for one subject matter are generally not usable for other subject matter. Laboratories designed for engineering instruction can't be used for home economics; laboratories for language instruction can't be used for botany. Even within one department or subject area there usually must be separation by levels of instruction. An advanced laboratory for the growth of viral and bacterial cultures is not normally usable for lower division students in basic microbiology, no more than laboratories for organic and polymer chemistry can be used for beginning chemistry. Some highly specialized laboratories must be equipped for use by one or two courses only. Others, such as accounting laboratories can be used much more generally, sometimes for all laboratory courses offered by the department. Laboratories are therefore less elastic in use than lecture rooms.

Room period utilization rates for laboratories are normally high when a number of sections of the same course can be taught in one laboratory. Beginning chemistry, geology, biology, and zoology get high rates of utilization because there are large numbers of students taking these courses, and therefore many sections of the course can be scheduled. Such laboratories may be used 50 to 60 hours a week on an average.

On the other hand, highly specialized laboratories, which are no less essential than general purpose facilities, can sometimes be used by only three or four courses a week. In general most lower division laboratories can be used at higher room period utilization rates than upper division and graduate laboratories.

Unscheduled Use of Facilities

It should be pointed out that the room period utilization rates of Arizona public institutions of higher education shown for lecture rooms and laboratories on the preceding pages measure only scheduled utilization by class sessions. This is but a part of their total utilization during the semester. In addition to the formal scheduling of classes, there is considerable use of lecture rooms, laboratories, and seminar rooms during hours when classes do not meet in them. This use includes the scheduling of departmental seminars and colloquia, use for departmental faculty meetings and conferences, use by faculty and student professional and honor societies, use by student societies and clubs, and scheduling of institutional and public meetings. In addition to these uses many laboratories are occupied by students throughout the day and evening whenever they are free of classes. Typical of laboratories that are used in this way by students to complete laboratory assignments and improve their subject matter facility are drafting, accounting, statistical, and language laboratories.

Teaching laboratories are also commonly used by advanced students and faculty for research projects in connection with their studies or projects whenever such facilities are not in use by classes. Thus the unscheduled use of facilities is extremely high at most institutions. The first semester of 1964-65, for example, just those meetings, colloquia, conferences and other such activities formally reserved through the central scheduling agency at the University of Arizona amounted to 1,782 hours, about 100 hours a week of use. This does not include use by students for extra study or other assignments which do not normally clear through the central scheduling office.

A large number of classes at all institutions are scheduled in facilities other than classrooms and laboratories. Such facilities as faculty offices, local schools, hospitals, farms, athletic fields, gymnasium floors, and the like are all used for instructional purposes but are not included in utilization analyses of classrooms and laboratories. Such utilization can be substantial. As an example, there were a total of 2,500 hours of instruction in such facilities at the University of Arizona the first semester of 1964-65. Such scheduling could be equally high at the other institutions in the state. Classes held in offices and other facilities are frequently put there because additional space is not always available at certain critical times in regular facilities.

Student Station Utilization

In addition to analyzing utilization by room period use, it is also possible to measure student station use. This is a comparison of the number of seats actually occupied in a room against the number available when the room is in use. It was pointed out at the beginning of this section that this measurement means different things depending upon the rapidity of the enrollment growth of the institution. If the growth rate is static, high student station utilization expresses efficiency of use; if the growth rate is increasing rapidly, very high rates may signify that class sizes are reaching the physical limitations of the classrooms.

Student station utilization rates are available for only the three universities, but it can be concluded on the basis of square foot allocation of floor space per full-time equivalent student in junior college classrooms and laboratories that in general student station utilization rates would tend to be high where there is less classroom space per student than normal. This suggests that classrooms would tend to be better utilized than if there were on the average more space per full-time equivalent student available.

The three universities show the following percentages of student station utilization rates for general classrooms and laboratories.

TABLE 7

	General Classrooms	Laboratories
Arizona State University	60%	73%
Northern Arizona University	70%	76%
University of Arizona	58%	72%

The average utilization of student stations in classrooms given in the norms for public degree-granting institutions (88 institutions) is 56 percent, and for laboratories (68 institutions)[5] 68 percent. A comparison with these norms demonstrates that all three universities have better than average utilization.

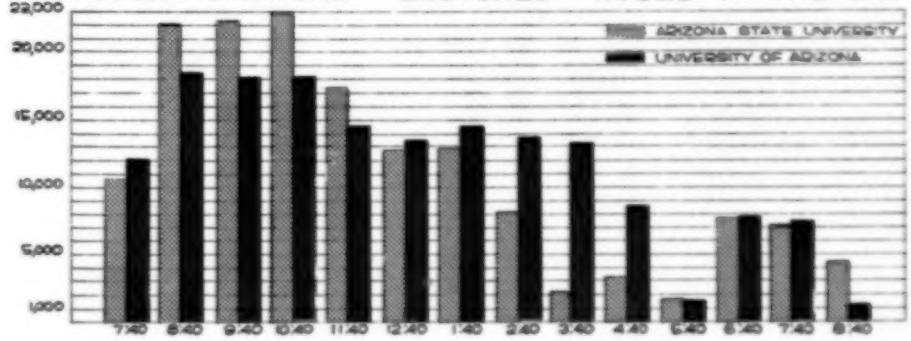
It is interesting to note that laboratory station utilization is normally higher than classroom utilization. This is so for a number of reasons. Laboratory instruction is usually limited to smaller numbers of students than lecture instruction because of the necessity for individual attention in the setting up, conducting, and interpreting of laboratory problems. Further, a laboratory station requires about three times the amount of floor space a seat in a lecture room does; thus there are structural limitations imposed upon the sizes of laboratories. Since laboratories are built to accommodate fewer students than lecture rooms, higher rates of utilization are easier to achieve than in lecture rooms.

Distribution of University Scheduling

The distribution of student stations over the periods of the day and the days of the week provides a good indication of scheduling practices at institutions of higher education. Such distributions appear in Tables 15 thru 20 for Arizona State University and the University of Arizona for general classrooms and laboratories, and for all rooms.

FIGURE 15

STUDENT STATIONS — LECTURES — HOURS OF THE DAY



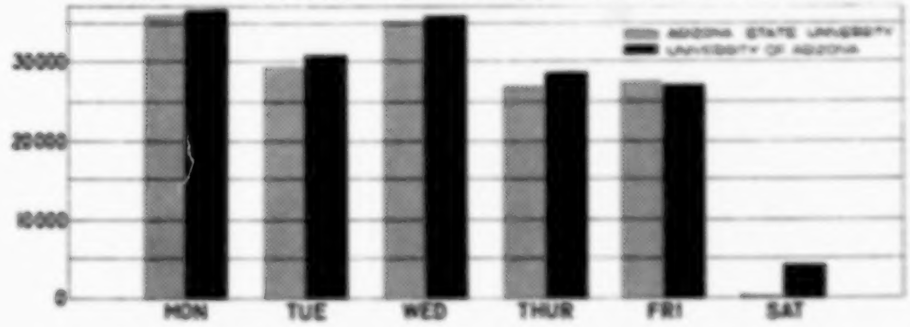
It can be seen in Figure 15 that both schools distribute their scheduling load of lecture classes fairly well throughout the day with the University of Arizona having a somewhat more even distribution in the late afternoon and Arizona State University a better distribution at the 8:40 hour in the evening. Sixty-one percent of the instructional load in lecture rooms at Arizona State University is taught in the morning hours, 25 percent in the afternoon, and 14 percent in the evening. At the University of Arizona 50 percent is in the morning, 39 percent in the afternoon, and 11 percent in the evening hours. It is typical of most colleges and universities that lecture instruction predominates in the morning hours. This is counterbalanced to some degree by laboratory instruction in the afternoons, a distribution of which is shown in Figure 17.

Distribution of student station use in lecture rooms by days of the week appears in Figure 16.

It can be noted that Mondays and Wednesdays are the heaviest scheduled of the five week days. Although Fridays appear more lightly scheduled than earlier days of the week, this is primarily due to lighter scheduling in the evening hours only. Morning and afternoon scheduling is at about the same level as Mondays and Tuesdays. Friday evenings are particularly difficult to schedule because of weekend activities. Saturdays are scheduled half a day only and this accounts for lower utilization since morning hours only are represented.

FIGURE 16

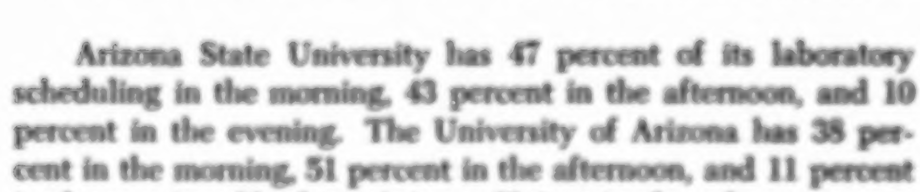
STUDENT STATIONS — LECTURES — DAYS OF THE WEEK



The counterbalancing effect of morning lectures by afternoon laboratory sessions can be seen in Figure 17 below, particularly at the University of Arizona.

FIGURE 17

STUDENT STATIONS — LABORATORIES — HOURS OF THE DAY

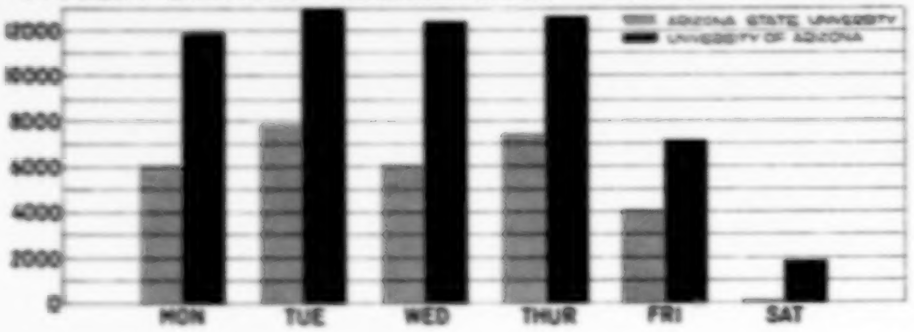


Arizona State University has 47 percent of its laboratory scheduling in the morning, 43 percent in the afternoon, and 10 percent in the evening. The University of Arizona has 38 percent in the morning, 51 percent in the afternoon, and 11 percent in the evening. Northern Arizona University for whom percentages only are available schedules 48 percent in the morning, 46 percent in the afternoon, and 7 percent in the evening. The difference in the total volume of laboratory scheduling at Arizona State University and University of Arizona suggests that enrollments at Arizona State University are not as heavy in laboratory instruction as they are at the University of Arizona.

Much the same pattern can be seen in laboratory scheduling by days of the week as was evident in lecture scheduling by days of the week (see Figure 16) in the following graph.

FIGURE 18

STUDENT STATIONS — LABORATORIES — DAYS OF THE WEEK

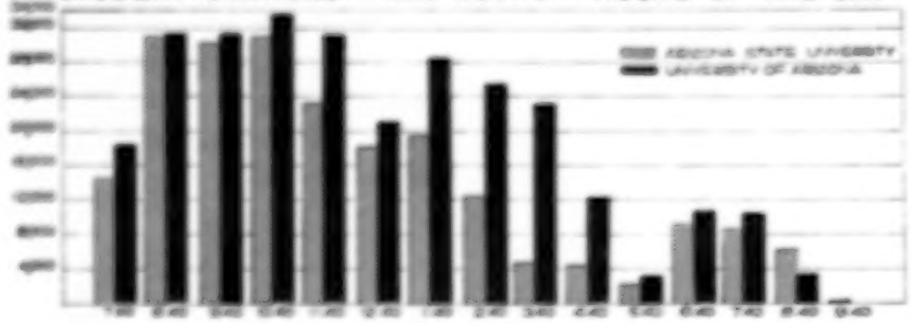


The first four days of the week are rather evenly matched with a lesser degree of scheduling on Fridays and Saturdays. Both Arizona State University and University of Arizona schedule laboratories somewhat more heavily on Tuesdays and Thursdays than on other days of the week. This is so because three-hour lectures are commonly given on Mondays, Wednesdays, and Fridays, and laboratory sessions, to avoid conflict, are offered on Tuesdays and Thursdays.

The total scheduling in all instructional rooms, lectures, laboratories, seminar rooms, and auditoriums, is shown by period of the day in Figure 19.

FIGURE 19

STUDENT STATIONS — ALL ROOMS — HOURS OF THE DAY

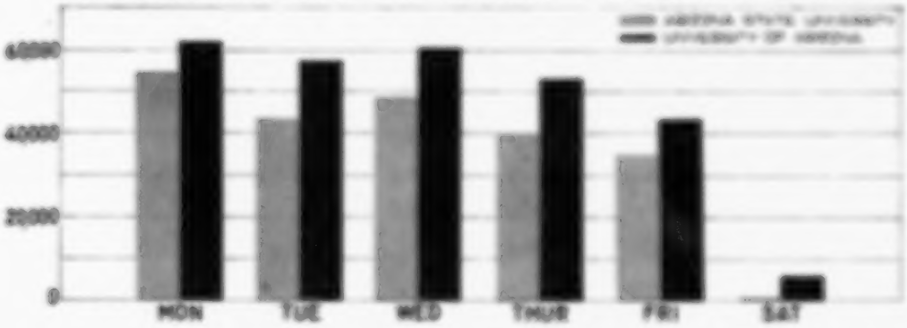


There is fairly good distribution at both institutions of total scheduling throughout the day with the University of Arizona having somewhat better afternoon utilization and Arizona State University somewhat better evening utilization at the 8:40 hour. It is evident from this distribution that both institutions schedule from 15 to 16 hours a day from 7:40 in the morning to 10:00 at night at the University of Arizona and 10:40 at Arizona State University. Classes are conducted through both the noon hour and the dinner hour in order to get the fullest use of classrooms and laboratories.

Total scheduling in all rooms by days of the week is shown in Figure 20.

FIGURE 20

STUDENT STATIONS — ALL ROOMS — DAYS OF THE WEEK



Summary

In summary, it has been shown that Arizona public institutions of higher education presently lack the floor area needed to support the student bodies they are currently enrolling, their utilization rates for both general classrooms and lectures are generally higher than national norms for room period use and for student station use. It is also apparent that at Arizona State University and University of Arizona the instructional load is well distributed throughout the day and week.

CHAPTER IV

Financing of Higher Education in Arizona

The finances of institutions of higher education are normally divided into several categories for purposes of control and accounting. There are first the budgets of the institutions and second, accounting processes for the recording of receipts and expenditures in the budgets.

The Budgets

Two principal budgets are commonly used: an Operation Budget and a Capital Expenditure Budget. The operations budget of an institution is comprised of the operating budgets of the separate departments. Its largest single item is salary expenditures. Personal services (both salary and wages of personnel employed by the institution to conduct its programs) typically make up from 77 to 82 percent of the operating budgets of universities. The operating budget is in actuality the educational, research, and service plans of the institution translated into dollars. In public institutions the operating budget is submitted to the governing agency (the Board of Regents in the case of the universities) about a full year before it is approved by the legislature. This means it is submitted by department heads as much as a year and a half before the legislature approves it. In this period of rapid growth of enrollments, increasing difficulties in replacing and hiring new faculty, climbing costs of equipement and supplies, it becomes especially difficult to anticipate changes and needs a year and a half in advance, but an orderly process of planning calls for at least this much lead time in budgeting; so methods for anticipating change that will affect the institution a year and a half hence must be built into planning. One of these tools is the long range enrollment projection. All public institutions of higher education in Arizona have prepared projections of enrollment for at least a ten-year period. These will be presented in a later chapter.

The other budget is the capital expenditures budget which covers construction of new buildings, remodeling, campus improvements, equipment for new buildings, and land purchases. This budget translates square feet of floor space for increasing enrollments, programs, and services, and over-all facilities needs for the campus into dollar amounts. Capital expenditure budgets are also prepared a year to a year and a half in advance of submission to the legislature. Presently each of the three universities has submitted a five-year construction plan to the Board of Regents. Such long range plans are based largely upon the anticipated enrollment growth and the growth of programs at the institutions.

Accounting Categories

Several accounting categories peculiar to higher education institutions have been established for the management of receipts and expenditures of institutional funds. These categories are primarily functional and derive from the necessity of handling funds which have special sources of revenues or which are used for distinct purposes. There are generally four categories in institutional accounting systems. These will be presented below followed by an indication of typical sources for and expenditures from each of the several categories. A discussion of finances of the universities will be given first, followed by a discussion of junior college finances.

Educational and General Funds

General and educational funds are operating funds used by the various colleges and departments for instructional, organized research, and service programs. This category includes also library, physical plant, and general administrative funds. Included are such items as salary, wages, minor equipment, supplies, equipment rentals, travel, telephone service and the like. It represents the principal expenditure of the university.

FINANCING OF HIGHER EDUCATION IN ARIZONA

The chief source of general and educational funds for all nine public institutions of higher education in Arizona is the state government. For the three universities combined it represented 68 percent of total general and educational funds in 1965-66. By institutions, the state appropriated 71 percent of Arizona State University's general and educational funds, 73 percent of Northern Arizona University's, and 66 percent of the University of Arizona's. The balance of the educational and general funds of the three institutions came principally from student fees. Twenty-seven percent of Arizona State University's and the University of Arizona's educational and general funds came from this source, and 25 percent of Northern Arizona University's. Other sources of income for educational and general funds are federal monies from land-grant receipts, including Smith-Lever Act funds and Hatch Act funds. Still other sources are local funds for county laboratories, training schools, and county extension services. These latter sources of income vary from institution to institution and may represent from one-half of one percent to six percent of general and educational funds.

The following table shows educational and general funds for the three universities for the last ten years with state appropriations and income from other sources indicated.

TABLE 8
UNIVERSITY EDUCATIONAL AND GENERAL FUNDS
1956-57 to 1965-66

	State Appropriation	Other Than State Appropriations*	Total Budget
Arizona State University			
1956-57	$ 2,329,717	$ 833,794	$ 3,163,511
1957-58	3,069,714	1,104,800	4,174,514
1958-59	3,703,047	1,411,234	5,114,281
1959-60	5,056,432	2,002,210	7,058,642
1960-61	5,781,426	1,953,703	7,735,129
1961-62	6,537,450	2,225,893	8,763,343
1962-63	7,568,878	2,580,706	10,149,584

(Table continued on following page)

1963-64	8,821,547	3,306,300	12,127,847
1964-65	9,781,692	3,820,900	13,602,592
1965-66	10,817,205	4,397,000	15,214,205
Northern Arizona University			
1956-57	695,831	202,057	897,888
1957-58	842,683	187,270	1,029,953
1958-59	870,385	280,090	1,150,475
1959-60	979,075	385,750	1,364,825
1960-61	1,172,426	346,555	1,518,981
1961-62	1,398,909	517,150	1,916,059
1962-63	1,857,330	533,600	2,390,930
1963-64	2,224,110	705,460	2,929,570
1964-65	2,584,760	819,950	3,404,710
1965-66	3,067,430	1,031,850	4,099,280
University of Arizona			
1956-57	4,201,195	2,299,483	6,500,678
1957-58	5,453,778	2,835,086	8,288,864
1958-59	6,590,265	3,122,508	9,712,773
1959-60	7,726,482	3,876,631	11,603,113
1960-61	8,867,606	4,270,840	13,138,446
1961-62	9,916,457	5,056,591	14,973,048
1962-63	10,995,743	5,677,976	16,673,719
1963-64	12,394,778	6,696,208	19,090,986
1964-65	13,516,905	7,456,649	20,973,554
1965-66	15,388,184	8,077,002	23,465,186

*Student Fees, Federal and State Endowment Earnings, Federal Funds, Miscellaneous Collections, etc.

Auxiliary Enterprises Funds

Auxiliary enterprises are activities operated for the benefit of the students or the institution as a whole and include dormitories, food service, book stores, mimeograph service*, married student housing, automobile pool, health service*, faculty parking, and similar operations.

The sources of the funds for the operation of these agencies are rent receipts, income from cafeteria and food sales, sales of books, charges for parking, transportation charges, and mimeographing charges and the like. Each auxiliary enterprise account is set up separately so that a check may be made to determine whether each operation is self sufficient. All such activities are operated in such a way that they are self sustaining. Income from some of these activities is used to retire bond indebtedness and to pay for the services rendered. Income from dormitories, for example, pays for the operation, maintenance, and construction of dormitories. Income from food service pays for the salaries of cafeteria personnel, the maintenance and operation of student unions, and the retirement of bond indebtedness on the student union building.

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*These services are included in the educational and general funds at Arizona State University and Northern Arizona University.

The following table gives receipts and expenditures for dormitory operation at each of the universities for 1964-65. Dormitory income and expenditures represent the largest share of auxiliary enterprise funds. The entries below demonstrate clearly the self sufficient aspect of auxiliary enterprise operations.

TABLE 9

	Receipts and Expenditures of Dormitories 1964-65	
	Receipts	Expenditures
Arizona State University	$1,285,902	$1,043,334
Northern Arizona University	808,757	678,722
University of Arizona	1,298,910	1,272,084

Agency Funds

Agency funds are funds which do not belong to the institution but which for convenience in operations are held by the institution. Alumni Association funds, for example, are agency funds. Disbursements from these funds are made by the Alumni Association. Funds for cooperative dormitories are sometimes held in agency funds as well as faculty group insurance and retirement collections. Deposits by prospective students for dormitories are held as agency funds and are credited to dormitory receipts only after the student has arrived on campus.

Income to agency funds comes primarily from faculty, students, and alumni of the university and is held until it is transferred to institutional funds or is disbursed by the responsible agency.

Special Restricted Accounts Funds

These are accounts set up for specific projects or specific purposes. Construction funds, for example, are held in individual accounts until a building is completed and paid for. Research contracts with the federal government are separate accounts in this category as are also summer session finances. Restricted funds come from a variety of sources: the state, the federal government, from bond sales, from sales of some farm produce, from student fees (as is the case with summer session funds) and from fee collected for services (as is the case with basic sciences examinations).

Junior Colleges

Like the universities, junior college financing includes both budgeting and accounting practices. Categories of accounting are somewhat similar to those at the universities. There are categories corresponding to educational and general funds, auxiliary enterprises funds, and special restricted funds.

About 50 percent of the educational and general budgets of the junior colleges comes from the state. The state appropriates $525 per full-time equivalent student for the first 1,000 students enrolled at a junior college, and $350 for each full-time equivalent student over that number. An additional 39 percent comes from the county, 8 percent from student fees, and 3 percent from miscellaneous sources. Support from the state and county comprises 89 percent of junior college educational and general funds. This is so because a junior college does not charge tuition to its own county residents. Arizona residents from counties without junior colleges must pay at a rate of $10.00 per semester hour at Maricopa County Junior College District to a maximum of $116.00 a semester, (if they are regular students) or $18.50 per semester hour to a maximum of $250.00 a semester (if they are non-regular students), $17.00 per semester hour at Yuma County Junior College District to a maximum of $202.50 a semester, $19.00 per semester hour at Graham County Junior

TABLE 10

	State Appropriation	County Operations	County Debt Service	Other than State & County	TOTAL BUDGET
ARIZONA WESTERN					
1962-63	—	325,213	—	—	325,213
1963-64	243,600	420,456	—	59,223	723,279
1964-65	389,550	499,691	165,579	198,913	1,253,733
1965-66	654,500	265,971	227,275	264,448	1,412,194
COCHISE COLLEGE					
1962-63	—	—	—	—	—
1963-64	—	286,838	—	13,891	300,729
1964-65	254,450	473,518	44,621	68,476	841,065
1965-66	472,500	330,833	204,680	188,315	1,196,328
EASTERN ARIZONA					
1962-63	303,100	151,083	—	—	454,183
1963-64	356,300	157,473	—	136,801	650,574
1964-65	276,150	168,168	—	202,669	646,987
1965-66	356,475	N/A	N/A	N/A	N/A
MARICOPA DISTRICT					
1962-63	—	—	—	—	—
1963-64	1,657,600	1,308,978	810,543	501,580	4,278,701
1964-65	2,552,900	1,594,880	707,750	499,216	5,354,736
1965-66	3,567,200	N/A	N/A	N/A	N/A

Source: Arizona State Board of Directors for Junior Colleges.

College District to a maximum of $219.00, and $22.00 per semester hour at Cochise County Junior College District to a maximum of $250.50 a semester. Tuition for non-Arizonans is $300 per semester for 12 hours or more. These student fees are the source of 8 percent of the educational and general funds of the junior colleges.

Funds for construction come from three sources: from state appropriations, from bonding (whether district bonding or bonding for auxiliary enterprises), and from the federal government. Initially when a junior college is built the largest portion of the construction funds comes from a county bond issue. The state supplies $500,000 to each county for construction of the initial plant. Thereafter the state appropriates $115 per full-time equivalent student each year for construction funds. Junior colleges receive federal funds for construction and equipment under Title I of the Higher Education Facilities Act of 1963, and under Titles III and IV of the Higher Education Facilities Act of 1965. These latter two titles concern federal assistance for the improvement of undergraduate instruction and for strengthening developing institutions.

Table 10 shows educational and general income for junior colleges from state, county, and other sources for 1962-63 through 1965-66. Part of the data for 1965-66 is not available for Eastern Arizona College and the Maricopa District.

Instructional Costs

The calculation of instructional costs is done differently for the universities than for the junior colleges because of differences in programs. The single major program of the junior colleges is instruction, and therefore costs can normally be calculated by dividing the educational and general budget by the full-time equivalent student enrollment (a full-time equivalent student is one carrying 15 units). This same procedure cannot be used at the universities despite the fact that attempts are sometimes made to arrive at student costs in this manner. It cannot be done this way because the universities have three major programs, all of which are included in the educational and general category. These three programs are teaching, research, and public service.

Included in instructional costs are all departments of instruction, part of administrative costs, part of library costs, and part of physical plant costs. Included in research costs are such departments as the agricultural experiment stations, a bureau of business research and similar divisions, part of library costs, part of administrative costs and part of physical plant costs. Included in public services costs are such agencies as the agricultural extension service, museums, a bureau of mines, county training schools, part of physical plant costs, and part of administrative costs.

In order to correctly calculate the cost of instruction, functions such as research and service must first be separated from instructional functions. Accounting practices at most universities are devised to allow this separation. If a faculty member, for example, devotes part of his time to teaching and part to agricultural research in the experiment station, his salary is normally split between the budgets of the instructional departments in which he teaches and the agricultrual experiment station, in which he does research. General administrative costs and physical plant costs are allocated in accordance with the percentage of effort a particular office devotes to the three institutional programs. The Registrar's and Admissions offices may have 100 percent of their activity devoted to instructional services. Allocation for the business office can be made according to the percentage of instructional funds it handles. Library costs can be allocated according to a number of different practices, one of which is a detailed study of library usage for instruction, research, and service.

Instructional Costs at the Universities

With research and service functions isolated from the educational and general budget, it is possible to determine an average cost per full-time equivalent student at the universities. These are, however, average costs only.

It should be borne in mind that costs vary by levels and by subject matter. It costs more to educate a senior than it does a freshman or sophomore simply because the senior is concentrating in a subject area and is usually taught therefore in smaller classes than a freshman who is not yet concentrating in a subject field. The freshman may attend some lectures which average 100 or more students. The senior will rarely be in classes of 50 or more. It costs more to educate a graduate student than it does a senior. At this level of his education the graduate student is specializing even more than the senior and may be attending classes which rarely have more than 25 students.

A student majoring in physics is usually more expensive to educate than a student majoring in education simply because the teaching of physics requires much more elaborate and expensive equipment than does the teaching of education. A chemistry or engineering major for the same reason is more expensive to educate than a history or an English major. Students in most language and English composition classes are more expensive to educate than are those in many other lecture classes because language and composition cannot usually be taught effectively in large classes.

From this it becomes apparent that the size of classes, the nature of the instruction, and the cost of equipment enter very strongly into educational costs. Of these factors, class size is perhaps the most important determinant, but it too has its variables. A class of 50 taught by a full professor is more expensive to educate than a class of 50 taught by an instructor for the obvious reason that the professor is paid a larger salary than the instructor. This example also serves to demonstrate another point. The single largest instructional cost at any institution is faculty salary. This item more than any other determines educational cost. It follows from this that in those departments where salaries must be high in order to attract and hold faculty, all other things being equal (class sizes, equipment costs, floor space needs, etc.) the instructional costs will be higher than in those departments where lower average salary scales are evident. Costs will be highest in the departments where salaries are highest and class sizes smallest. Thus upper division and graduate instruction conducted in smaller classes with higher ranking faculty will generally be higher in cost than lower division instruction. Average costs cannot tell much about differences in costs between subject matter areas, types of instruction, or levels of instruction.

It is common practice when comparing costs from institution to institution to ask why the instructional cost per student is lower at one university and higher at another. Any knowledgeable businessman would not compare the cost of a paperback book with the cost of a hardback volume. He knows that different amounts of material and different amounts of labor are necessary to produce each product. It is precisely the same with different levels of education and different types of programs. Different materials and different amounts of labor are employed in different cases. Similarly if two companies produce both paperbacks and hardbacks, one should not compare costs between them unless one knows what the proportion of paperback to hardback production is at each plant.

Fortunately in the example above the efficiency of operation of the two companies can often be judged on the basis of profit. If Company A makes a larger profit than Company B, it is said that Company A is the more efficient operation.

Unfortunately no such easy criterion is possible in higher education. We do not have an absolute measure to determine whether University A is more efficient than University B because neither is operated on a profit basis, and we cannot judge their efficiency of operation on the basis of costs alone because different amounts and types of material, and different amounts and prices of labor are involved. But this comparison of costs between institutions of higher education as a measure of efficiency still goes on year after year. The costs of instruction at institutions with large undergraduate programs are compared with costs at institutions with predominately graduate programs, to the detriment of the latter. Costs at institutions with large science, engineering, and medical colleges are compared with costs at institutions specializing primarily in teacher education and the humanities, to the detriment of the former. If $1,379, the cost of educating a full-time equivalent student at the University of California in 1963-64 is compared with $485, the cost of educating a full-time equivalent student at the Agricultural and Technical College of North Carolina in 1963-64, what has been determined? That the institution in North Carolina is more efficient than the University of California? Wouldn't it be better to ask what kinds of programs are being compared? What levels of education are being compared? What the professional level of the faculty is? These questions are all more pertinent than a simple comparison of costs.

This does not mean, of course, that a knowledge of costs of instruction is worthless. On the contrary, an institution should periodically review costs by types and by levels of instruction to properly evaluate its operation and to determine where and for what its resources are being expended. Such analyses coupled with enrollment trends and projections allow an institution to plan ahead with greater accuracy. If, for example, there is a trend toward proportionately larger upper division and graduate enrollments, it can probably be estimated that instructional costs will rise by a certain factor if present upper division and graduate costs are higher than lower division costs. If the trend is toward larger enrollments in engineering and science, it can be estimated that costs per full-time equivalent students will change according to a certain factor if current costs in these programs are known. If the trend is toward business, education, and the humanities, it can be estimated that costs will change by a factor if costs in these areas are available. If more laboratory instruction and less lecture instruction is judged beneficial, the additional cost of instituting such a change becomes apparent when comparative costs of laboratory and lecture instruction are determined.

This then is the chief virtue of cost analyses: the ability of institutions to analyze the flow of resources into various educational programs and the ability to forecast future needs with greater accuracy.

With these reservations about the use and meaning of cost figures in mind, the following table of costs per full-time equivalent student at the public institutions of higher education in Arizona is presented. It should be pointed out that the costs shown in Table 11 do not represent costs to the state. The costs shown below include funds from student fees, which in the case of the universities defrays about 25 percent of the cost. In the costs between subject matter areas, types of instruction, or levels of instruction.

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It should further be pointed out that costs at the universities represent an average of lower division (freshmen and sophomores), upper division (juniors and seniors), and graduate costs. The instructional costs at the junior colleges represent *lower division costs only*. Typically upper division costs of instruction are about double lower division costs and graduate costs about double upper division.

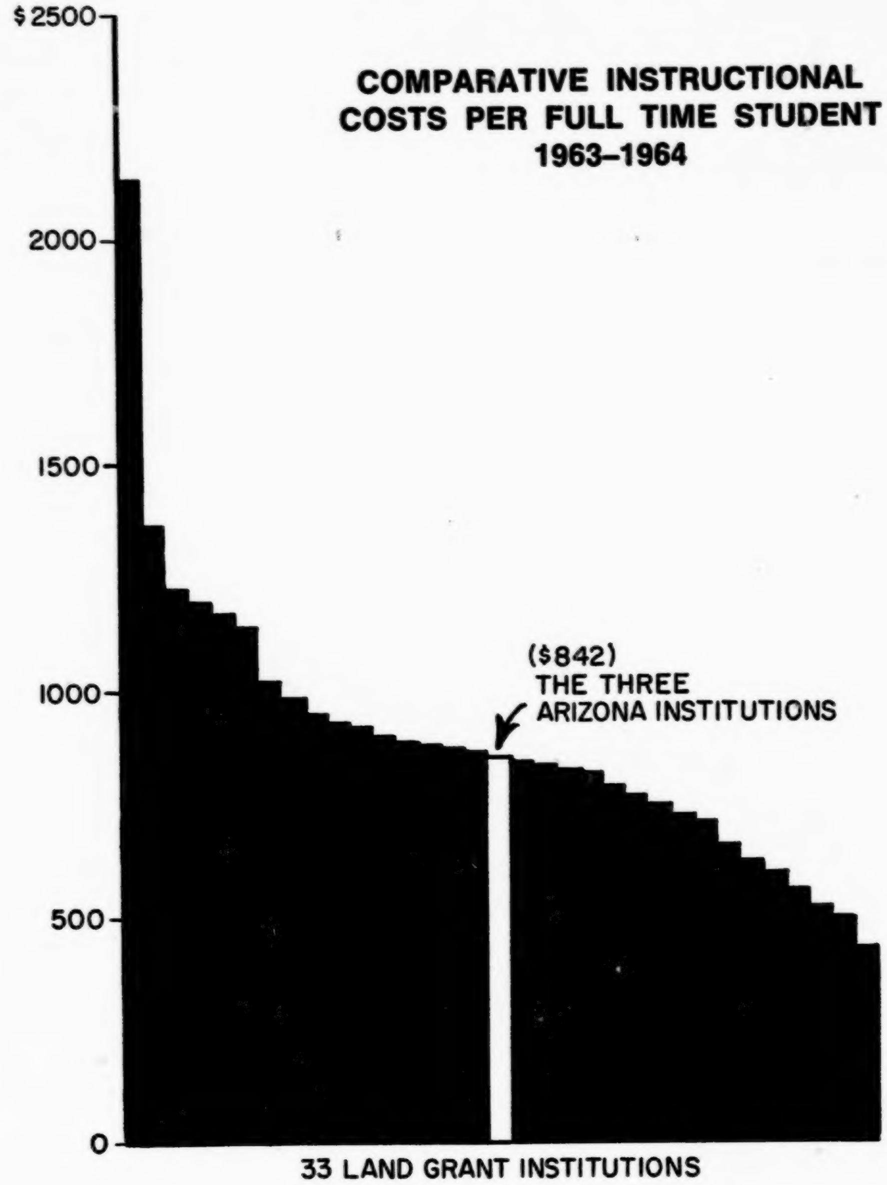
TABLE 11
INSTRUCTIONAL COSTS PER FULL-TIME EQUIVALENT STUDENT PER YEAR, 1964-65

Junior Colleges		Universities	
Ariz. Western College	$ 944.00	Ariz. State University	$877.00
Cochise College	1007.00	Northern Ariz. Univ.	817.00
Eastern Arizona College	854.50	University of Arizona	846.00
Maricopa Jr. Colleges	611.00		

It can be noted that costs at Cochise and Arizona Western are somewhat higher than those at Maricopa junior colleges. Ignoring differences in programs and in types of instruction which certainly could account for major cost differences, the chief variable appears to be newness and smaller sized student bodies. An institution just beginning operation has certain fixed costs to overcome before costs per full-time equivalent student begin to drop. Administrative costs, library costs, plant maintenance and plant operations costs are relatively fixed and do not increase in proportion to enrollment increases. This would appear to be the chief factor in the higher costs at these two institutions. As their enrollments grow therefore, per student costs generally will tend to drop.

Because of variances in programs at the three universities it is impossible to make comparisons that have much validity. In a very general way there is indication that costs at the three institutions are about average for public universities. The following graph is presented, recognizing that all the problems in comparison described earlier are inherent in it, merely to indicate the approximate relative position of costs per full-time equivalent student at the universities.

FIGURE 21



It can be seen in Figure 21 that in 1963-64 the three Arizona universities placed about midway in the table. This suggests in a very general way that instructional costs at the three institutions are about average when compared with 33 land-grant institutions throughout the nation.

State Appropriated Costs Per Student

To emphasize the relatively low cost to the state of educating Arizona youth in its universities, the following table is presented. On it are shown state appropriations received by 50 land-grant institutions across the nation and their enrollments for 1963-64 (the most recent year for which data are available). The last column of Table 12 divides the state appropriation by the enrollment of the institution to get an amount appropriated by the state for each student. Institutions are ranked according to the amount appropriated per student by the state. Institutions which received the greatest amount per student are ranked at the top, those receiving the lowest at the bottom.

It can be seen in Table 12 that the relative positions of the three Arizona institutions are extremely low when compared with the amount appropriated per student by most other states.

Some qualification of this table is needed. Those schools with medical colleges have been asterisked because they do not compare well with institutions without medical colleges. It should also be borne in mind that different types of programs are being compared in Table 12. It should be used therefore only as a very rough index of relative costs to states.

The enrollment figures used include extension as well as on-campus registrations because these data are the only available for the institutions in the 49 other states.

Head counts were used because full-time equivalent enrollment statistics are not readily available for other states. This would not however, alter the relative positions of the institutions noticeably.

TABLE 12

LAND-GRANT COLLEGES RANKED BY DOLLARS OF STATE APPROPRIATIONS PER STUDENT

NAME OF INSTITUTION	Fall 1963 Enrollment	Income from State Appropriations (in thousand dollars)	Dollars of State Appropriations per student
1. Univ. of Illinois*	35,859	76,062	2,121
2. Univ. of Florida*	14,801	29,383	1,985
3. Washington State Univ.	8,792	16,522	1,879
4. Univ. of Kentucky*	11,348	21,252	1,873
5. Texas A&M Univ.	8,175	13,948	1,706
6. Clemson (S.C.) Agric. Coll.	4,376	7,123	1,628
7. Univ. of California*	99,208	160,067	1,613
8. West Virginia Univ.*	9,854	15,620	1,585
9. Univ. of Arkansas	8,745	13,724	1,569
10. Univ. of Idaho	5,084	7,815	1,537
11. Univ. of N.C. at Raleigh	9,192	13,428	1,461
12. Iowa State Univ.	11,516	16,694	1,450
13. Cornell University*	13,131	18,677	1,422
14. Louisiana State Univ.*	19,302	26,452	1,370
15. Univ. of Nebraska*	11,463	15,632	1,364
16. Univ. of Massachusetts	8,809	11,669	1,325
17. Purdue University	22,675	29,756	1,312
18. S. Dakota State Univ.	3,714	4,771	1,285
19. Kansas State Univ.	9,158	11,761	1,284
20. Univ. of Alaska	3,949	4,846	1,227
21. Oregon State Univ.	10,420	12,494	1,199
22. Univ. of Missouri*	25,595	28,924	1,130
23. N. Dakota State Univ.	3,988	4,461	1,119
24. Univ. of Nevada	5,599	6,141	1,097
25. Virginia Polytechnic Inst.	8,918	9,618	1,078
26. Univ. of Vermont*	4,010	4,169	1,040
27. Michigan State Univ.	31,931	32,385	1,014
28. Univ. of Wyoming	5,996	6,025	1,005
29. Auburn University	9,819	9,772	1,000
30. Univ. of Puerto Rico	22,693	22,662	999

31. Univ. of Connecticut	13,633	13,219	970
32. Ohio State Univ.*	34,184	32,781	959
33. Utah State Univ.	7,759	7,242	933
34. Colorado State Univ.	8,452	7,888	933
35. New Mexico State Univ.	5,000	4,661	932
36. Univ. of New Hampshire	4,528	4,136	913
37. Mississippi State Univ.	6,025	5,475	909
38. Univ. of Wisconsin*	38,883	34,079	876
39. Univ. of Georgia	13,741	12,964	874
40. Univ. of Hawaii	12,972	11,184	862
41. Pennsylvania State Univ.	29,753	25,285	850
42. Univ. of Tennessee*	18,333	15,416	840
43. Univ. of Maryland*	29,290	24,395	833
44. Rutgers, The State Univ. (NJ)	23,024	20,553	827
45. Oklahoma State Univ.	15,294	12,176	796
46. Univ. of Minnesota*	49,228	38,411	780
47. UNIV. OF ARIZONA	18,083	12,365	684
48. Univ. of Rhode Island	8,891	6,066	682
49. Univ. of Maine	7,940	5,254	662
50. Univ. of Delaware	8,364	5,423	648
51. NORTHERN ARIZ. UNIV.	4,060	2,224	548
52. ARIZONA STATE UNIV.	17,046	8,822	518

*Asterisk denotes functioning medical school.

Further, it is not quite fair to compare non-land-grant institutions (Arizona State University and Northern Arizona University) with land-grant institutions because of the considerable difference in the programs of the two types of institutions.

Despite the deficiencies of the data in Table 12, it is possible to draw from it the rough general conclusion that state appropriations per student at Arizona universities are very low when compared with state appropriations per student at land-grant institutions in other states.

Capital Outlay Costs

Capital outlay costs per full-time equivalent student can be calculated for Arizona State University and the University of Arizona, following a somewhat different principle than that used for calculating instructional costs. Costs of constructing dormitories and student unions can be deducted from capital outlay costs because costs of these are carried by bonding and paid from rents and food sales.

A general rule of thumb for the calculation of capital outlay costs can be set down to help simplify the procedure. One million dollars of capital outlay, amortized over fifty years (the average usable life of a campus building*), results in a $20,000 yearly amortized cost per million dollars of capital outlay:

$$\frac{\$1{,}000{,}000}{50 \text{ years}} = \$20{,}000 \text{ yearly amortized cost.}$$

This amortized cost divided by a full-time equivalent student enrollment in any year will result in an average cost for each full-time equivalent student for each million dollars of capital outlay invested in the plant up to that year. For Arizona State University and the University of Arizona these costs per full-time equivalent student for each million dollars of capital outlay invested in physical plant by the state will be as follows in 1966-67.

TABLE 13

			Cost per FTE Student in 1966-67 for each $1-million of State Appropriated Capital Outlay
Arizona State University (FTE students Sept. '66):	$\frac{\$20{,}000}{16{,}766}$	=	$1.19
University of Arizona (FTE students Sept. '66):	$\frac{\$20{,}000}{19{,}418}$	=	$1.03

For each million dollars of capital outlay at Arizona State University the cost per full-time equivalent student in 1966-67 will be $1.19, and $1.03 at the University of Arizona. The state appropriated cost of the total physical plant at each of these two institutions is shown for 1966-67 in Table 14.

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*50 years is also the amortization rate used by insurance companies for covering university buildings.

TABLE 14

	Total Appropriated Plant Cost by 1966-67*
Arizona State University	$40.3 million†
University of Arizona	$47.8 million

*Includes all state appropriations for all campus buildings up to 1966-67.
†Includes some federal funds for construction.

To complete the calculation, the cost of instructional physical plant at each institution, rounded to millions and one decimal in Table 14, should be multiplied by the cost per million for each full-time equivalent student from Table 13. This results in the cost of state appropriated capital per full-time equivalent student shown in Table 15 below.

TABLE 15

	Cost of Capital Outlay per FTE Student
Arizona State University	$47.96
University of Arizona	$49.23

Out-of-State Student Costs

The question is posed consistently from many quarters whether the out-of-state student pays his way at the universities. An indication of whether he does or not can easily be obtained by adding instructional costs from Table 11 to capital outlay costs in Table 15 and comparing these with out-of-state fees. Since instructional costs and capital outlay costs at each university are not the same, it is necessary to calculate costs for each separately. These are shown in Table 16.

TABLE 16

Arizona State University	$877.39	Instructional Cost
	47.96*	Capital Outlay Cost
	$925.35	Total Cost per FTE Student
University of Arizona	$845.84	Instructional Cost
	49.23	Capital Outlay Cost
	$895.07	Total Cost per FTE Student

*Costs at Arizona State University are actually lower than this because federal funds are included in their plant costs.

Tuition and registration fees are set by the Board of Regents (and upon occasion by the legislature) and are identical at the two institutions. There are, however, slight variations between the institutions in laboratory and miscellaneous fee collections; the following best expresses the average for Arizona State University and University of Arizona.

TABLE 17

$ 195.00[*]	Paid by all students (2 semesters)
815.00	Paid by non-resident students (2 semesters)
50.00	Average laboratory and miscellaneous fees (2 semesters)
$1,060.00	Out-of-state student pays for 2 semesters (this does not include any summer session fees)

[*] All students actually pay $269 registration fee per year. Of this amount $195 goes into the educational and general budget.

From the foregoing it becomes very clear that the out-of-state student does pay the full costs of his education at each university *and also helps substantially to pay the educational costs of Arizona students as well.* At Arizona State University the out-of-state student pays $134.65 over and above the cost of instruction and the cost of capital outlay, and at the University of Arizona he pays $164.45 over and above costs.

The capital cost figures shown earlier are conservative for a number of reasons. First, all buildings are included in the total cost of plant shown in Table 14, regardless of age. There are a number of buildings older than 50 years on both campuses which are included in the calculations. Obviously the amortization rate on these buildings should be extended or the cost dropped from the total. If extended, the amortization rate in some cases would be 60 or 70 years for particular buildings. A change in the amortization rate for these buildings would reduce the cost per full-time equivalent student of capital outlay at each institution. If the cost of such older buildings was dropped from the calculation the cost of capital outlay per student would also decrease.

Further, no attempt has been made in calculating the total appropriated cost of the entire physical plant at each campus in 1966-67 to deduct that space in buildings used for research and service. Agencies such as an agricultural extension service, county training schools, bureaus of business research, poison control center, a bureau of mines, and the like should be wholly or partially excluded because their functions, though educationally related, are primarily in the interests of the farmers, the businessmen, the manufacturers, the mining interests, and the citizens of the state generally. If such deductions were made, capital expenditure costs per full time equivalent student would drop considerably.

Instructional costs at all three institutions were calculated for 1964-65 (the latest figures available at the time this report was written). Instructional costs per full-time equivalent student for 1966-67 will not, however, vary more than a few dollars up or down and consequently will not appreciably affect the figures above. Again it should be remembered that the instructional costs used in the calculations in Table 16 are not costs to the state but are costs based on the instructional portion of educational and general funds, about 68 percent of which is borne by the state

There is a fallacy implicit in the consideration of capital outlay costs for out-of-state students. The assumption implicit in the consideration of such costs is that for every out-of-state student enrolled, so many dollars worth of physical plant must be added. This is not the case. Only when the number of out-of-state students reaches the point where space must be added is there a cost incurred. Whenever classrooms and laboratories are capable of absorbing out-of-state students no additional plant is required and the full tuition less instructional costs must be considered an asset. Whenever a class section is capable of absorbing an out-of-state student without hiring additional faculty or purchasing additional supplies or equipment, costs of instruction are increased and the full out-of-state tuition can be credited as an asset. Thus we are really concerned with the marginal costs of educating out-of-state students which would be lower than the average costs used in the calculations earlier. This being the case the out-of-state student can be considered to subsidize the Arizona student even more than earlier calculations have shown.

TAX SUPPORT OF HIGHER EDUCATION IN ARIZONA

There is a definite trend for public spending to become a larger part of the national income This is in line with the trend to spend relatively more of our income for services instead of goods. Governmental units primarily provide services rather than goods.

Despite this upward trend of public expenditures as a percentage of the national income, the ability to pay for these expenditures has increased more rapidly. Ability to pay, in the final analysis, is measured by the taxable margin above subsistence. This margin has increased despite the increase in public spending.

The real problem in financing higher education is not whether we have the ability to pay. We have it. The basic question is how to make the best alternative use of our income. Should we tax ourselves to spend more on higher education? Do we have a greater need for some other governmental service? Or would we be better off if we left a larger portion of our income in the taxpayers' hands for private spending?

The answer to these questions requires our very best collective value judgment.

The following pages will present some historical perspective and some statistical facts to assist in forming a sound value judgment.

Perspective

One measure of a nation's economic progress is the proportion of its population directly engaged in agriculture. The lower this proportion is, the greater the economic progress. In 1800, 94 percent of the population was rural and only 6 percent urban. In 1960 these figures were exactly reversed. Only 6 percent of the labor force was engaged directly in agriculture. This left 94 percent to engage in manufacturing and other activities necessary to provide a high standard of living.

Once it was thought that a large percentage of the labor force in manufacturing was a sign of economic progress. But this index may no longer be valid. Growing from a very small beginning, 24.8 percent of the labor force was in manufacturing in 1950. By 1960 this had increased to 25.7 percent. In the future automation will probably reduce this percentage and, as in the case of agriculture, a declining percentage of the labor force in manufacturing may be regarded as a sign of progress.

In Arizona, however, only 12 percent of the 1960 labor force was in manufacturing. This proportion will undoubtedly increase in the future, for as the Arizona economy matures, it will tend to conform more closely with the national pattern.

If we have declining percentages of the labor force in agriculture and in manufacturing, where will the growth in employment be? The answer is in the marketing and service industries. (See Tables 18 and 19.) In the nation as a whole the percentage of the labor force in the service industries, including financial services, rose from 33 percent in 1940 to 40 percent in 1960.

TABLE 18

CIVILIAN LABOR FORCE IN THE UNITED STATES BY INDUSTRIES

1940, 1950 AND 1960

(In Thousands)

Major Industry Groups	1940		1950		1960	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Agriculture[1]	8,559	16.2	7,034	11.9	4,350	6.4
Mining	919	1.7	931	1.6	654	1.0
Manufacturing	10,670	20.2	14,685	24.8	17,513	25.7
Construction	2,088	4.0	3,458	5.8	3,816	5.6
Utilities[2]	3,143	6.0	4,450	7.5	4,458	6.5
Trade	7,497	14.2	10,507	17.7	11,793	17.3
Financial	1,475	2.8	1,920	3.2	2,695	4.0
Services	8,574	16.3	10,092	17.0	13,550	19.9
Public. Admin.	1,415	2.7	2,514	4.2	3,203	4.7
Unclassified	730	1.4	843	1.4	2,608	3.8
Unemployed	7,635	14.5	2,854	4.8	3,505	5.1
Total	52,705	100.0	59,288	100.0	68,144	100.0

Source: U. S. Census of Population — 1960-PC(1)1C — U. S. Summary, General Social and Economic Characteristics, pp. 214 and 223.

[1] Includes forestry and fisheries.

[2] Includes transportation and communications.

In addition to the humbler services, such as those provided by service stations and barber shops, we have experienced a great growth in health services, recreational services, financial services, educational services, legal services, and many other professional services. Higher living standards are comprised of and provided the demand for these services. Some are provided by private enterprise and some by governmental units. Higher education is a service like this. Some of it is private but most is public. The greatest majority of those engaged in providing services to the public whether health, legal, financial, educational, or other professional services receive their training in the colleges and universities of the nation.

TABLE 19

CIVILIAN LABOR FORCE IN ARIZONA BY INDUSTRIES FOR 1940, 1950 AND 1960

Major Industry Groups	1940		1950		1960	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Agriculture[1]	32,305	18.0	35,592	13.8	34,681	7.6
Mining	12,806	7.2	10,494	4.1	14,669	3.2
Manufacturing	12,729	7.1	21,398	8.3	54,968	12.1
Construction	8,890	5.0	20,441	7.9	40,068	8.8
Utilities[2]	11,839	6.6	21,507	8.3	29,051	6.4
Trade	27,392	15.3	52,007	20.1	86,708	19.1
Financial	2,960	1.7	7,278	2.8	21,205	4.7
Services	32,079	17.9	53,376	20.7	103,036	22.7
Public Admin.	5,756	3.2	12,724	4.9	25,271	5.6
Unclassified	2,217	1.2	3,860	1.5	20,205	4.5
Unemployed	30,074	16.8	19,521	7.6	24,126	5.3
Total	179,047	100.0	258,198	100.0	453,988	100.0

Source: U. S. Census of Population — 1960-PC(1)4C — Arizona, General Social and Economic Characteristics, pp. 65 and 73.

[1] Includes forestry and fisheries.

[2] Includes transportation and communications.

Historical Trends in Public Finance

In 1890 total governmental expenditure in the U.S.–federal, state, and local–amounted to about 5% of the national income. During the twenties all units of government spent 10% of the national income. During the thirties the percentage rose to 25% because of a sharp drop in income as well as an increase in governmental spending. When World War II was at its full intensity, total governmental spending was more than 50% of the national income. Since the Korean War, governmental spending has been about 30%.

This secular rise in the relative importance of governmental spending is largely due to the fact that governmental units provide services rather than goods. As a nation becomes more affluent, demand shifts relatively more toward services than goods. National defense, education, highway construction and maintenance, and welfare are the principal services provided by government. Despite the growth in taxes and despite inflation, the per capita real income above subsistence and after taxes has greatly increased since 1890. The taxable margin above subsistence—the ultimate measure of ability-to-pay—has increased much faster than public expenditures in the nation as a whole and in Arizona.

The ability to pay more taxes, in the ultimate sense of taxable margin above subsistence, is present. Whether we will pay more taxes to support more governmental spending for higher education (or any other governmental service) depends upon the judgment of the voters and their elected representatives. The real cost of any spending, public or private, is the sacrifice of alternatives that must be given up in order to make the spending possible. If the voters decide that further spending for higher education represents the best alternative, they will be willing to provide the necessary funds. In the final analysis, this is a collective value judgment, a value judgment that can be arrived at in part by a consideration of the importance of higher education to the socio-economic prosperity of the nation.

THE IMPACT OF HIGHER EDUCATION

In the last five to ten years there has been increasing attention paid to the impact upon the economic, political, and social aspect of our society by higher education. Americans like to know what they are getting for their money, and with the rapid growth of their institutions of higher education taking place with consequent rapid increases in public support, there have been, increasingly, attempts made to assess the value of higher education to the nation, the state, the community, and the individual. What are some of these impacts of the past and the present?

De Tocqueville in the first half of the 19th century indicated that one of the greatest dangers to American democracy was encouraging those at the bottom of the social and economic scale to reach for levels beyond their grasp. As a result of this observation he was pessimistic about America's future. He did not foresee the growth of higher education, in particular the public institutions in this country; or, if he did, he measured their development in terms of institutions on the continent, which catered largely to the aristocracy. The American public institutions supplied the ladder needed to provide upward mobility. Higher education became a way by which human resources could develop rather than lying fallow in the lower economic reaches of the society. The barriers between upper, middle, and lower class strata were pushed aside readily by a piece of sheepskin. The son of the laborer and tenant farmer once could look forward to little more than following the paths his father and his grandfather trod. The state college and university broadened his horizon, raised up his vision, and gave the lie to de Tocqueville's pessimism.

In an excellent book, *Higher Education in a Maturing Democracy,* concerned in part with the socio-economic impact of higher education in America, Louis Geiger points out perceptively that the great shift from an agrarian to an industrialized economy with the consequent diminishing of rural and increase of urban population was brought off easily in part because of those very colleges created to improve the lot of the farmer. As he points out, "Actually, almost from their origin even the most avowedly agricultural and mechanical colleges founded to make farmers prosperous and happy rather than to get them out of business altogether were doing the latter, more or less unconsciously. Their engineering branches developed ahead of the agricultural ones and attracted the boys 'too smart to farm' as the farmers themselves put it."[1] He points out correctly that these colleges offered physical and occupational mobility to a great number of rural young.

Another point this author makes is that the contributions of agricultural experiment stations located at public agricultural colleges insured agricultural abundance through new techniques in farming. Such techniques were developed in public institutions and primarily in land-grant colleges and universities and disseminated to the farmers as a public service by these institutions.

Similarly in industry, college and university trained engineers made major contributions to new techniques and to developing new resources which were responsible in part for the ability of this nation to respond in two major wars with feats of productivity unequalled by any other nation. This high level of productivity was largely responsible for the victories in both conflicts. Today at Cape Kennedy the efforts to conquer our next frontier are largely the efforts of men trained in the universities and colleges of this country.

In America we take our lawyers, our judges, doctors, teachers, scientists, musicians, technicians, economists and professional specialists for granted. It is a part of our culture, part of our heritage as a great and powerful nation. It is hard for us to visualize a country without them, a country whose public officials, leading citizens, businessmen, or industrialists were never trained to high professional attainments. But such countries exist and where they do resources lie undeveloped, public health problems are unsolved, law is primitive, freedom tenuous. Scientific and technological progress lags; national defense is weak. The economy is retarded; the tax base is stunted.

There are nations which fit this description but not many major ones. The importance of an educated population is well recognized. Russia has poured resources into its schools and colleges in anticipation of benefits which are already beginning to show in their scientific efforts. Small nation after small nation has called upon this and other countries to help it establish school systems, build colleges, create universities. Latin America is now embarking upon a project to create a system similar to the agricultural experiment stations and agriculture extension services of American land-grant institutions in order to bring about the agricultural revolution that took place in this country as a result of such agencies in the state land-grant institutions.

The impact of higher education is felt at all levels: the nation, the state, the county, and the community. Recent estimates by Arizona State University and the University of Arizona place the annual impact on their communities and consequently the state's economy at approximately $80-million. A comparable estimate for Northern Arizona University would be $25-million. This includes the operating budget, expenditures for construction, summer session expenditures, expenditures by students and expenditures by conference delegates and visiting parents. The total impact of these three institutions is in the neighborhood of 180 million dollars, and a substantial part of these dollars are from sources outside the state.

But the impact is much greater than this. In courtrooms and school rooms, in banks, mines and industry, in the legislature, in hospitals, in colleges, in businesses, in the home, on farms and on ranches, day to day the major impact of higher education is really made by the graduates of the institutions.

It has been said that public education is the only agency supported by the state which strengthens and carries on the ideals of democracy and, at the same time brings to its citizens a better economic, cultural, and moral life. Education is the perpetuating agency for the American way of life. Only because of its great commitment to education in all forms, has this country come so far so fast. Because of its commitment it will prosper and grow stronger.

It has been only within the last decade that economists have looked seriously upon the role of higher education in the economy of the country. Many economists are now actively considering the important part played by an investment in human resources through higher education. Theodore Schultz, one of the early leaders in this field, estimates that as much as three fifths and certainly no less than one third of the increase in national income between 1929 and 1956 can be attributed to investment in people through education. He indicates that "the most distinctive feature of our economic growth is the growth in human capital. Without it there would be only hard, manual work and poverty except for those who have income from property."[2] For backward countries Schultz points out it is "simply . . . not possible to have the fruits of a modern agriculture and the abundance of modern industry without making large investments in human beings."[3]

A recent report of a national committee on economic development of the United States stated that its most imperative recommendation for strengthening the economic growth of the individual states was support of education.

The importance of higher education to national defense is clearly evident in the National Defense Act of 1958 when many new programs and activities in both private and public institutions received federal assistance. This importance will in all probability not diminish in the years ahead. The dependence of the federal government on higher education to provide the talents and vital research needed for national defense will unquestionably become greater.[4]

Within their respective communities the colleges and universities of Arizona have become important cultural centers enriching the communities with concerts and lectures, with art exhibits and drama. They have conducted forums and debates for the general public, seminars and short courses for the business and professional people of the state. Major contributions have been made to the economy of the state in safflower, sugar beet, cotton, and mining production, in the improvement of cattle, dairy stock, and dairy processing, and in the improvement of range lands and forests, in poultry nutrition and production, in the control of parasites, insects, and plant diseases.

From the film libraries of the institutions go educational materials to schools throughout the state. Educational television reaches the homes of thousands of Arizonans every evening. Geological and mineral maps, pamphlets on everything from teenage nutrition to the care of lawns and flowers, are distributed across the state daily. The universities and colleges provide clinics for slow readers, for the hard of hearing, for educationally advanced and retarded children of elementary and high school ages. They provide centers for the rehabilitation of the physically handicapped and refresher courses for teachers of science and mathematics. They provide night schools for community adults and correspondence courses for those out of commuting distance. They provide consulting services to business and industry. They organize and conduct workshops for every conceivable subject from family finance management to computer applications in mining and industry. They have pioneered electronic record keeping for farms and ranches and conducted summer institutes for teachers, ranchers, farmers, businessmen, and professional specialists. There are, in fact, few areas in which the impact of higher education is not felt in the intellectual and cultural life of the citizens of the state.

CHAPTER V

The Impact of Federal Funds on Higher Education

In the United States there has always been concern that the Federal support would diminish the freedom and flexibility of public education. But after the Second World War the United States assumed political and economic world leadership, and new dimensions in the education and training of youth became an urgent necessity. Unlike the Soviet Union and most European countries, where education is either partially or fully maintained by central government funds, American public education has relied for its support primarily upon taxes at the local or state level, and response to national needs is consequently slow.

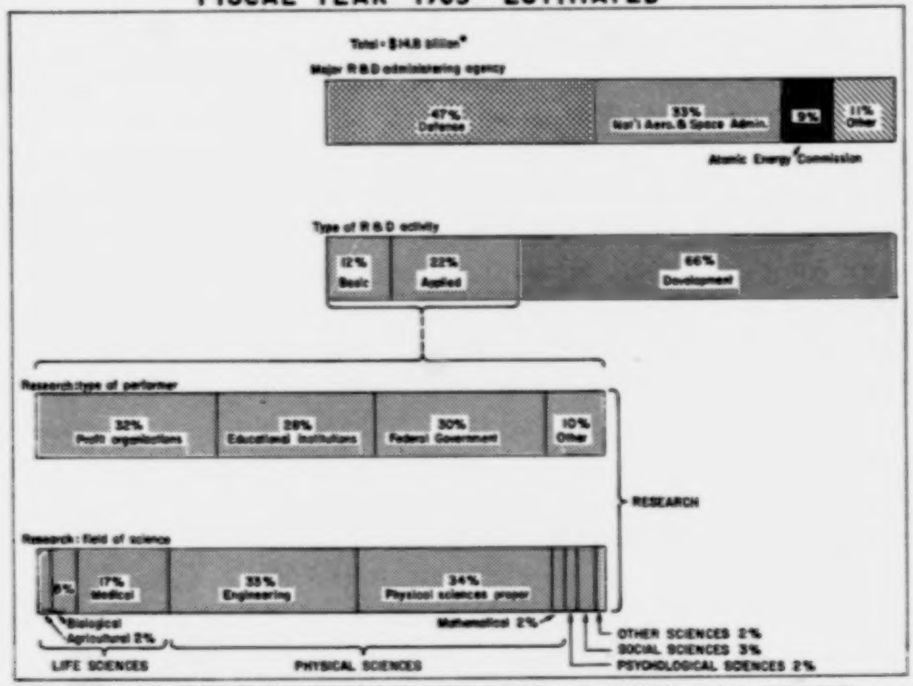
So for publicly supported higher education it became a question of Federal help, raising this dilemma: either to foster government support and run the risk of control, or forestall it and run the risk of allowing the country to fall behind. Relief came partially from private sources such as the Ford, Carnegie and Rockefeller Foundations; but gradually the nation has come to accept the idea of Federal support of education, and few have questioned support of research at universities. As a result, there has been a major and almost wholly beneficial impact upon our universities.

The broad picture looks like this.

In 1940 the Federal government spent $74 million for research, development and plant facilities (roughly interpreted as the equipment needed to conduct research). In 1966, an estimated $15.4 billion will be spent for these items. [1] Of the total amount spent for research, development and plant during this time (1940-1966) $125 billion or 54% was spent in the last five years.[2] Most of this money was devoted to development of new weapons systems and for the costly space program. About 20% was allocated to universities and large laboratories operated by universities under contract with the government. That part going to regular university departments is used to support basic research projects.

FIGURE 22

CHARACTERISTICS OF FEDERAL OBLIGATIONS FOR BASIC RESEARCH, APPLIED RESEARCH, & DEVELOPMENT FISCAL YEAR 1965 - ESTIMATED[27]



SOURCE: FEDERAL FUNDS FOR RESEARCH DEVELOPMENT & OTHER SCIENTIFIC ACTIVITIES, FISCAL YEARS 1964-1966 NAT'L SCIENCE FOUND.

*Excluding R&D plant

Although universities receive only a small part of the total expenditures, the amounts are nevertheless large enough to affect university operations. At the onset the Federal program placed a very real burden on the educational institutions. It required a sharpening of aims and a clarification of institutional goals by university administrators.

Few universities have accepted Federal grants uncritically. Administration procedures have been devised to evaluate each project proposal in relation to the appropriate goals or mission of the institution and the department concerned. Administrators have been aware of the financial effects upon university operations. Consequently the allowance for overhead costs has been a major problem. The present rule that the university should share in some of the costs (at least 5%) of each project is a sound regulation. If the overhead cost is much greater than overhead allowed, the university cannot afford to take the money. On the other hand, if the university must make *some* contribution, even 5%, then it will look carefully at the value to the institution of any project accepted.

Basic Research

The acknowledged need for basic scientific research grew out of the technological advances achieved during World War II. During the war, problems had been highly specialized and limited, e.g., radar to detect submarines. To compete in the postwar atomic era, much new research and many new scientists were needed. Government spending for basic research in 1964-1966 was $5.4 billion[4]. Of this amount 35% is now allocated to colleges and universities; 10% goes to the Federal contract research centers which are operated by educational institutions[5] (such as Lincoln Laboratory for defense-related electronics research at Massachusetts Institute of Technology, and Argonne National Laboratory for testing nuclear reactors at the University of Chicago).

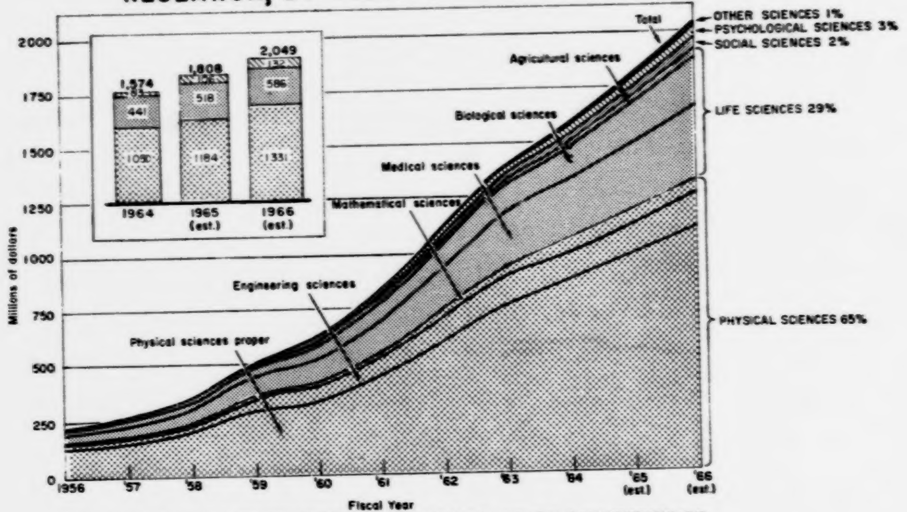
Applied Research

Basic research leads to applied research, which is its practical application. Of the $9.8 billion[6] in Federal funds allocated to applied research in 1964-1966, 20% went to educational institutions, including research centers.

Comparison of Figures 23 and 24 illustrating basic research and applied research funding will point out the breakdown:

FIGURE 23

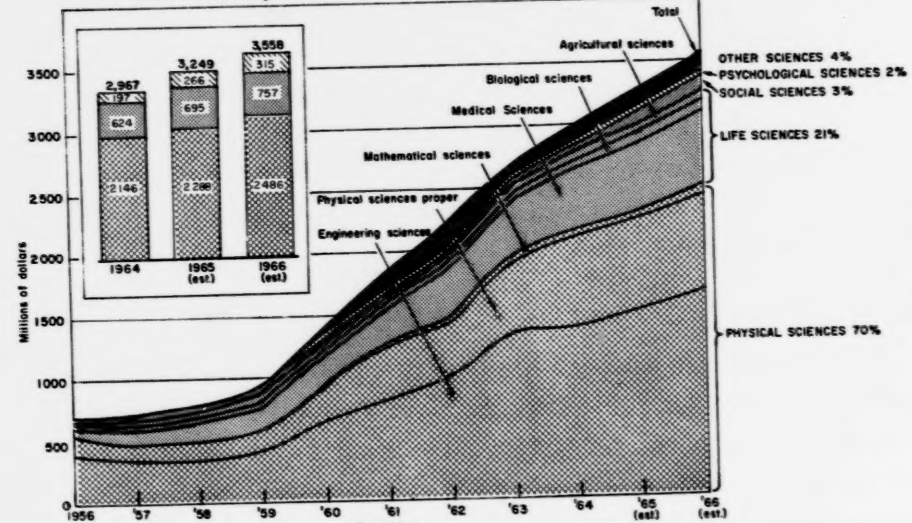
TRENDS IN FEDERAL OBLIGATIONS FOR BASIC RESEARCH, BY FIELD OF SCIENCE [31]



SOURCE: FEDERAL FUNDS FOR RESEARCH, DEVELOPMENT, & OTHER SCIENTIFIC ACTIVITIES, FISCAL YEARS 1964-1966

FIGURE 24

TRENDS IN FEDERAL OBLIGATIONS FOR APPLIED RESEARCH, BY FIELD OF SCIENCE [32]



SOURCE: FEDERAL FUNDS FOR RESEARCH, DEVELOPMENT, & OTHER SCIENTIFIC ACTIVITIES, FISCAL YEARS 1964-1966

Development

Development is required for commercial application of a researched product. Federal support for development work has increased to $9.7 billion (est.) in 1966.[9] Reflected in this large sum are such expensive items as spacecraft and nuclear reactors, as well as the manned lunar landing program. Although development will probably always play a relatively smaller role in terms of university allotted funds, it has had some important results. The ultra-violet irradiation of milk to produce Vitamin D was discovered and developed at the University of Wisconsin. Magnetic tape recording was researched and developed at the University of Minnesota; Pima cotton at the University of Arizona.

How Universities Spend Research Money

Most research grants include salaries, especially summer salaries for the principal investigator, but also salaries for technicians, secretaries, instrument makers, graduate students, and others. The investigator on a university campus now has the kinds of help that he would be given in an industrial laboratory. With the provision of research support for the entire year, with salary support for the summer, and with the many intangibles of living and working in an academic community, universities are now able to compete successfully for top level scientists as never before.

Federal grants have helped tremendously to update university laboratories. For example, the University of Arizona obtained a building costing $1,200,000 from the National Aeronautics and Space Administration, and also a $400,000 grant to support space-related research. Subsidies to research assistants have made it financially possible for many students to complete their graduate studies. Federal grants help the universities to provide good teachers. Most research scientists on campuses choose university life because it allows them to teach students. Since a scientific textbook is now rapidly outdated, a teaching research scientist is of obvious benefit to his students.

The scientist must staff his project with people. Students have a very real role, supported by the modern scientific equipment which government funds have enabled the university to purchase. These tools, the scientist and his facilities, attract good students who will be the next generation of physicists, biologists, chemists, astronomers, geologists. These highly intelligent and well-trained people will help build not only the state's industry and economy but the country's as well.

The principal support for improvement in techniques of science education comes through the National Science Foundation. Science education programs include Graduate Traineeships (stipends for graduate students in critical fields of study); Institutes for College Teachers (to update the training of college teachers); and a similar very large program for high school and elementary school teachers; Research Participation for High School Teachers; grants for education of college and high school students; and Advanced Science Education projects (seminar in special topics for specialists); and studies for improvement of the course center in the sciences. Certain mission-oriented government agencies support traineeships to develop experts in areas of short supply (for example, air pollution, sciences related to space studies, or to public health). These programs are all centered at universities and contribute to their effectiveness.

Balance Between the Sciences and Humanities

Alarm is sometimes expressed at the preponderance of grants made to the physical and biological sciences to the neglect of the humanities and fine arts. Grants for physical sciences at the University of Arizona have been much more than one-half of the total. Biological sciences have trailed with less than one-fifth of the total. Grants in fine arts and in humanities taken together are less than one percent of the total. The glaring imbalance should be evaluated in the light of certain considerations. The world is currently in the midst of an explosion of knowledge and technology in the physical sciences and engineering. The only comparable event in history is the Industrial Revolution. It has been said generally that the body of scientific knowledge is doubling each eight to ten years. It is therefore not unreasonable that emphasis falls heavily today upon the physical sciences. A second consideration is that the humanities and fine arts do not need or use the costly instrumentation now required in scientific research. Nevertheless, an imbalance of this degree will not be favorable to our society, which more than that of any previous era is in need of human understanding. It is hoped that the new National Foundation on the Arts and Humanities now in the early stages of organization will become an effective influence. The great private foundations have very definitely turned more and more to grants for the study of social problems and to support of humanity studies.

The Importance of Federal Support for Research at Universities

No board of trustees, state legislature, or college president could ever have found the resources to lift education to the levels it is now reaching. There would be few resources available to replenish professional personnel in industrial and national laboratories unless educational institutions themselves could hold leading scientists whose projects could be worked upon by undergraduates and graduate students. University graduates at all levels from the bachelor to the doctoral degree would not be receiving the updated science that is now incorporated in the curriculum. Their loss would later be reflected in the economy and politics of our country, which, however one may or may not like it, has taken on the challenge of world leadership.

Research Support at the University of Arizona

All trends and results which have been described in the earlier part of this chapter are part of the impact of federal support for higher education and are apparent at the University of Arizona. Indeed this institution has received support considerably beyond what might have been expected in terms of its position in relation to other universities by the end of World War II. Currently the University of Arizona stands eleventh among all universities, public and private, in the amount of its support from the National Aeronautics and Space Administration. The research program at the Lunar and Planetary Laboratory accounts in large measure for this fact.

THE IMPACT OF FEDERAL FUNDS ON HIGHER EDUCATION

Evidence of the University's remarkable progress in research is provided in the report of the National Science Foundation, showing that the University of Arizona stands eleventh on the list of all public supported universities in the amount of research grants received for 1964-65, and about twenty-third when private institutions such as Harvard and Massachusetts Institute of Technology are included.

Administration of research grants at the University is handled by the office of the Coordinator of Research with a staff of five employees. All requests to private foundations or to government agencies are channeled through this office and must be approved by the Coordinator of Research who is directly responsible to the President. Proposals are approved only if they are compatible with the purposes and goals of the institution, that is, if they can contribute to the advancement of knowledge or if they provide a contribution to the instructional or extension programs of the University.

The business office of the University maintains a grants and contracts section which is responsible for accounting and fiscal reporting.

Figure 25 shows the growth of Federal support for research, instruction and facilities at the University of Arizona for the recent five year period. The three categories represented in the chart are not mutually exclusive. Facilities provided are, for the most part, used for research. Research, on the other hand, cannot be separated from instruction because research activities are very closely tied to graduate instruction, and one step removed from undergraduate instruction. The figures shown on the chart do not include facilities grants during the year 1965. Some of the very large grants the University has received include $4,134,937 for the Basic Sciences Building for the College of Medicine, $800,761 as matching funds for construction of the Modern Languages Building, and $4,045,000 under the centers of excellence program for the National Science Foundation to be allocated to the departments of astronomy, physics, chemistry and mathematics.

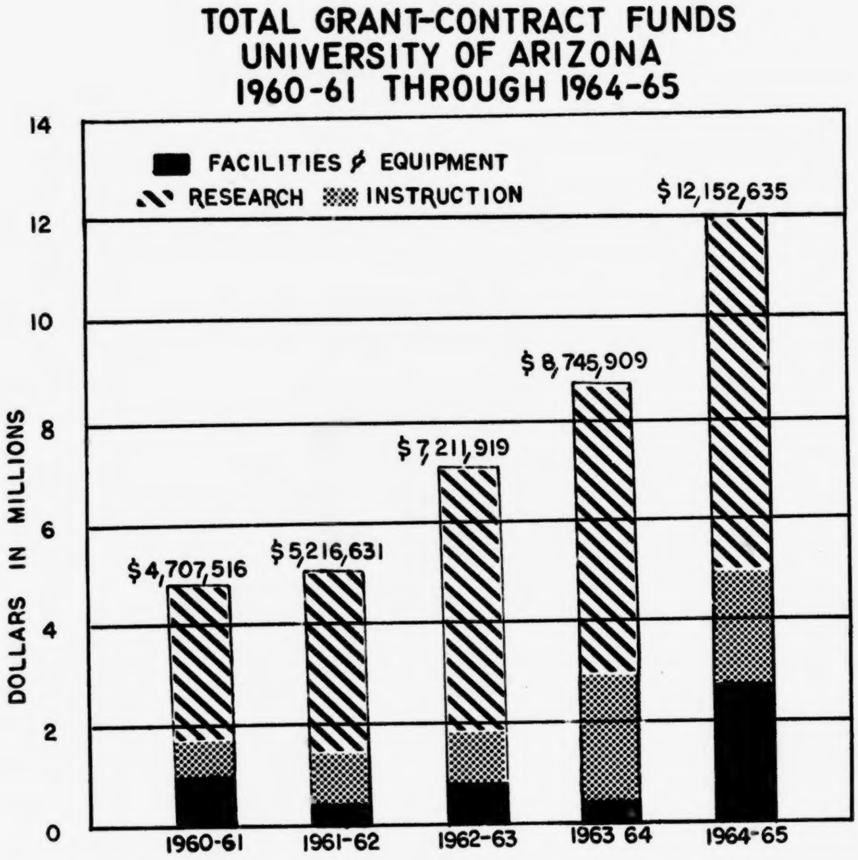


FIGURE 25

The topic of this chapter has been "The Impact of Federal Funds on Higher Education," but in this context it is essential to note that research at the University of Arizona is supported generously in that part of the institution's budget which is derived from funds appropriated by the state. Moreover, substantial grants for research and instruction have been received from the great private foundations such as Rockefeller, Ford, Carnegie, Sloan and others. Further, there is very substantial research support from large industrial organizations such as Dow Chemical, Du Pont, General Electric, Monsanto, Owens-Illinois, Union Carbide to name a few. Within the State of Arizona the university research program has benefited by grants and contracts from many sources such as other divisions of state government, trade and agricultural organizations and individuals.

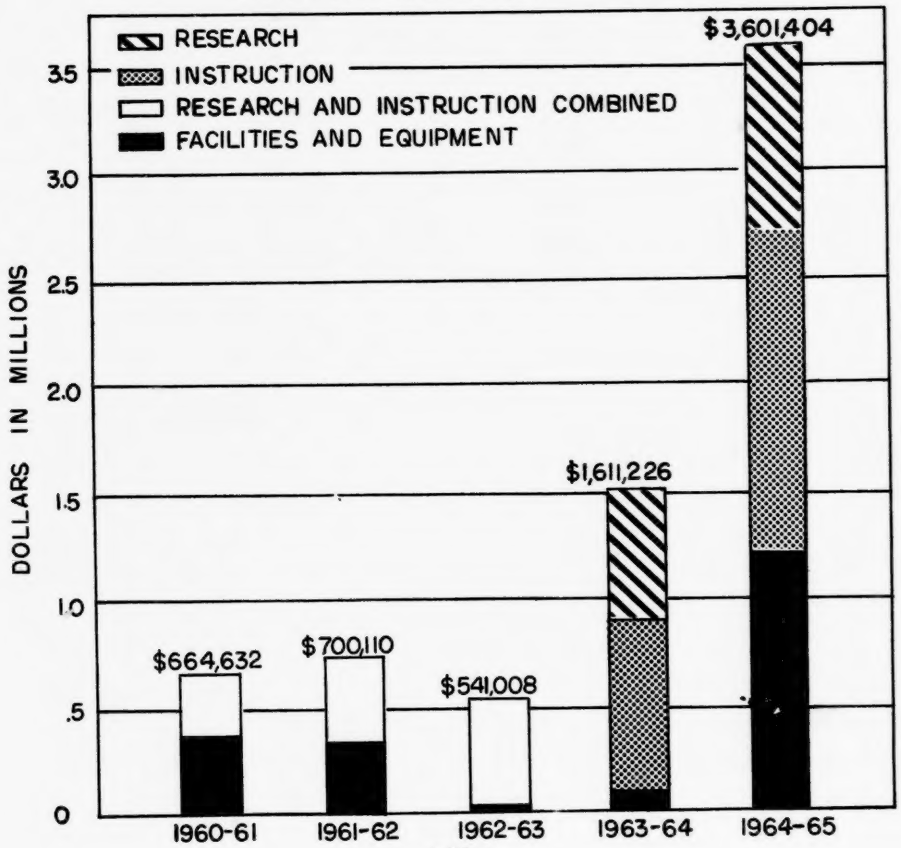
Research Support at Arizona State University

The growth of grant-contract funds at Arizona State University between 1960-61 and 1964-65 has been dramatic. From two-thirds of a million dollars in 1960-61 support has grown to over three and a half million dollars in 1964-65. This increase is graphically presented in Figure 26.

In addition to a considerable number of individual research grants and contracts the following three divisions of the uni-

FIGURE 26

TOTAL GRANT—CONTRACT FUNDS
ARIZONA STATE UNIVERSITY
1960-61 THROUGH 1964-65



versity have obtained substantial research support from both federal and private sources.

Laboratory for Meteoritic Research: In 1960 Arizona State University with financial aid from the National Science Foundation, the Arizona State University Foundation, and a private donor, acquired the Nininger Meteorite Collection. This collection, which has been increased by additions over the past five years, rates as one of the few great collections of meteorites in the world, both in the number of falls represented and the size and quality of specimens. The collection is administered by the Arizona State University Center for Meteorite Study. The investigation of meteorites has assumed an important position in the nation's overall investigation of space as the only extraterrestial materials available for direct study. Meteorites have become extremely useful as natural space probes and have revealed important information about cosmic rays. The collection is used principally for research purposes both at Arizona State University and at other qualified institutions. Over the past four years more than 750 samples have been sent to 55 investigators, both in the United States and other countries.

Investigations undertaken at Arizona State University in the past four years have mainly been in the area of mineralogy, petrology, and analytical geochemistry. They have directly involved five faculty members and have provided thesis-research material for a number of graduate students.

Computer Center: Arizona State University is most fortunate in having a computer center which is unequalled by most universities in this country. This major resource provides an unusual opportunity for the enhancement of modern scientific and engineering research. The center is organized with a view to providing the maximum benefit to the university community and to its governmental and industrial related programs.

As the result of several timely developments, the computer center was established in 1957 at about the same time the computer department of the General Electric Company was being organized and plans for its Phoenix facility were initiated. An advance unit of this group needed space and a large computer for its design efforts at the same time the engineering center at Arizona State University was nearing completion. Through a cooperative agreement between the university and General Electric Company the computer center was made a part of and located in the engineering complex. In 1962 another dimension for the computer center came into being. AIResearch Mfg. Company of Arizona, whose turbine engine business had greatly increased, was in need of space and computer facilities to design turbines and check test data. An agreement was reached whereby AIResearch arranged for the installation of a CDC-G20 in the computer center to augment its other equipment.

The faculty and manpower of the computer center are available to all departments of the university, serving a variety of educational and research needs.

Future plans are in prospect which will enhance university cooperation with Motorola, AIResearch, the General Electric Company, the Arizona Highway Department, the City of Phoenix, and the City of Tempe.

Poisonous Animals Research Laboratory: The establishment of the Poisonous Animals Research Laboratory was the outgrowth of the death of several children from scorpion bites. In 1944 and 1945 the Arizona legislature appropriated funds for the overall study of the scorpion problem.

Research Support at Northern Arizona University

The growth of grant-contract funds at Northern Arizona University has been tremendous. From thirty-three thousand dollars in 1960-61 grant-contract funds grew to over a million dollars in 1964-65.

This amount includes federal funds for building construction, and programs of education and research all funded from outside sources.

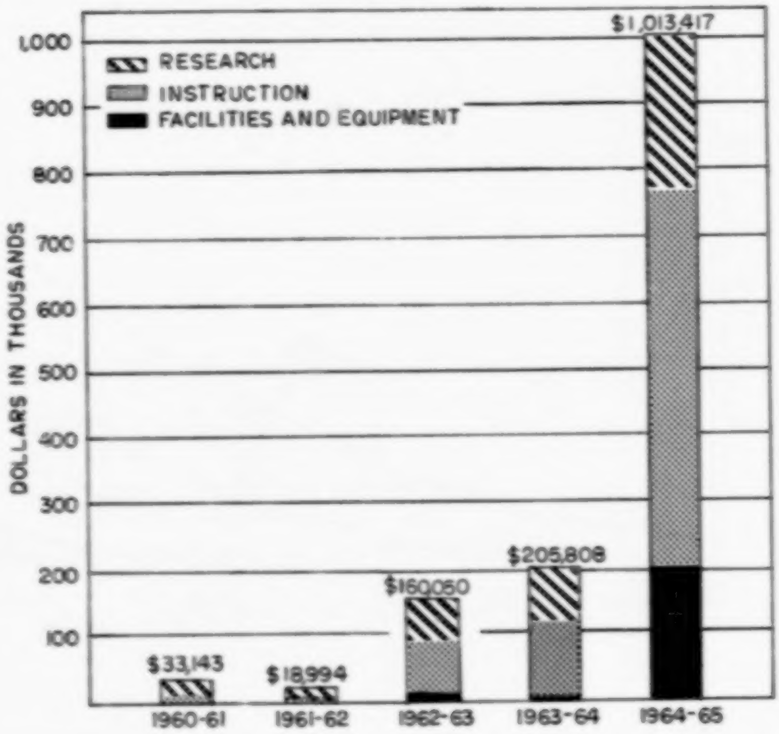
Of particular interest are a number of special rehabilitation programs including a Navajo rehabilitation project, a preparatory training project, and a grant for construction funds to house such rehabilitation programs. Funds for these projects have been made available in part by the Vocational Rehabilitation Administration and the Department of Labor.

The National Science Foundation has provided funds for several science training institutes which undertake to extend the professional competence of public school teachers of mathematics, physics, biology, and the earth sciences.

The Office of Educational Opportunity has sponsored a head start program and a number of new projects are developing under the Community Services Programs of Title I of the Higher Education Act of 1965. Figure 27 indicates the unusual growth of the grant-contract funds at Northern Arizona University.

FIGURE 27

TOTAL GRANT—CONTRACT FUNDS
NORTHERN ARIZONA UNIVERSITY
1960-61 THROUGH 1964-65



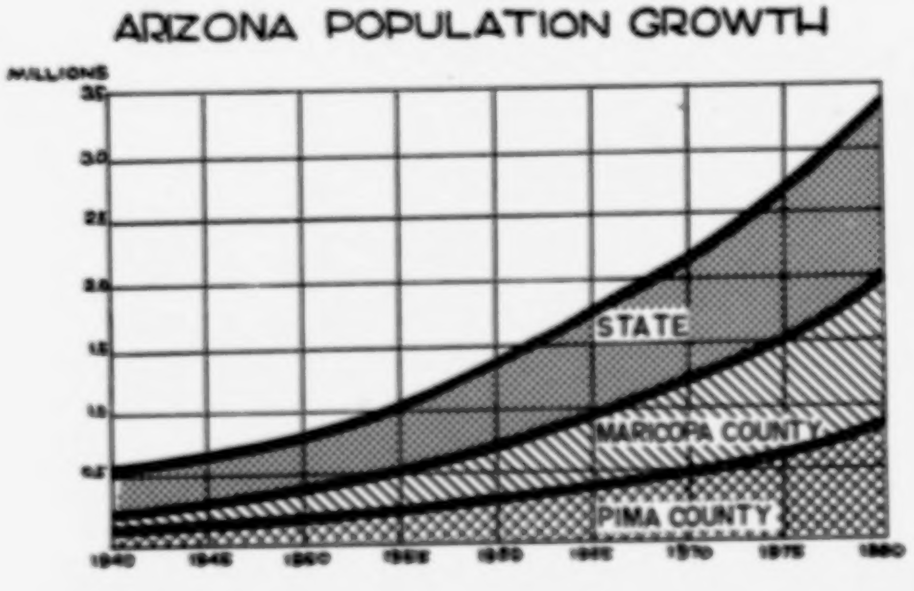
In addition to grant-contract funds, considerable federal assistance is received for the student loan program at Northern Arizona University. A substantial part of the present $600,000 student aid program comes from the Office of Education through the National Defense Education Act.

CHAPTER VI

Future Directions

A high birth rate, a low death rate, and a continued flow of new residents into the state will produce the following population increases in the next decade and a half.

FIGURE 28



By 1975 Arizona's population will reach two and three quarters million. There will be over a million and a half residents in Maricopa County and about 600,000 in Pima County,[1] the remainder of the state will account for 540,000 of the total population in the state. Year by year increases of the total population are shown in the following table.

TABLE 20

Year	Population	Year	Population
1966	1,763,000	1971	2,287,000
1967	1,858,000	1972	2,354,000
1968	1,962,000	1973	2,468,000
1969	2.070,000	1974	2,587,000
1970	2,180,000	1975	2,750,000

Since it will be a relatively young population, as pointed out in Chapter 3, with a larger college age proportion than will be the case nationally and since a relatively larger proportion of this college age group will attend college than will do so in the nation at large, it can be expected that enrollments in higher education will exceed the average for the nation as a whole.

Past enrollment trends indicate that college attendance in Arizona has increased at a strong and steady rate during the last ten years. By September of 1965 there were 64,811 students in all institutions of higher education, public and private, within the state. This represented 69 percent of the college age group (18-21 year olds) in Arizona in 1965. A conservative estimate puts enrollments in all Arizona institutions at 150,000 by 1975.

Before elaborating on this estimate it is appropriate to define what is included in the enrollment projections. When enrollments in higher education are considered in this report they will include only on-campus students. In the case of the universities only degree-credit students will be considered. Students taught at extension centers or through correspondence are not included because such enrollments are self-supporting and thus do not bear directly upon the costs of education. Nor are short courses or public instruction undertaken by such divisions as the Agricultural Extension Service, or by television bureaus considered except when degree-credit instruction is involved in television courses taken for credit by regularly enrolled students.

The prediction of 150,000 on-campus students by 1975 was developed by calculating the number of 18-21 year olds expected in the year 1975. This calculation is obtained by carrying forward live births in Arizona for the year 1954 through 1957 with allowances made for gains and losses through migration and death.

Projections of the 18-21 population based upon natural increase plus migration increases (in-migration minus out-migration) indicate that between 1965 and 1975 the size of the group will increase about 86 percent over the period. In other words, it will almost double. The following table gives estimated year by year increases of the 18-21 population in Arizona for the next decade.

TABLE 21

PROJECTION OF 18-21 POPULATION FOR ARIZONA, 1966 TO 1975

Year	Population	Year	Population
1966	102,878	1971	143,565
1967	113,489	1972	153,298
1968	120,591	1973	160,757
1969	126,615	1974	168,615
1970	134,650	1975	177,935

Source: Ronald B. Thompson, *Enrollment Projections for Higher Educaiton*, AACROA, 1961.

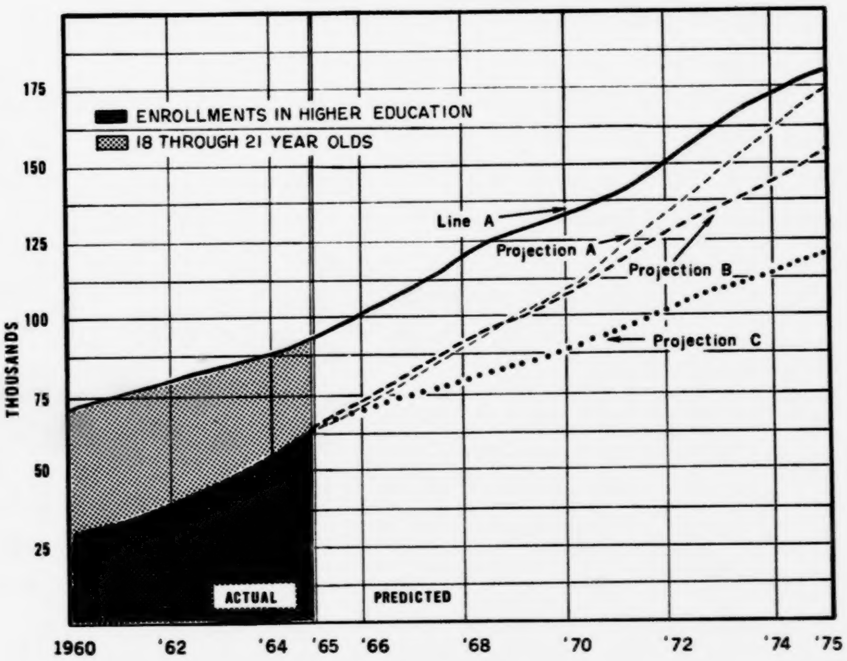
Earlier it was shown that college enrollments as a percentage of this group have increased steadily since 1940 when only 18 percent of the college age population constituted enrollments in higher education. In the twenty-year period between 1940 and 1960 this grew to 43 percent. Between 1960 and 1965 it increased to 69 percent. Between 1960 and 1965, the average increase in the percentage that college enrollments are of the college age group has been on the order of five percent per year. In the twenty-five year period between 1940 and 1965 the average annual increase has been slightly over 2 percent per year. Obviously the rate of increase will be greater in the next ten years than it has been in the last twenty-five, but it probably won't be as great as it has been the last five years because during this short period the number of junior colleges grew from two to six. It has been shown earlier that this development produced a sharp upward trend in total enrollments between 1963 and 1965. Assuming that there will be some additional junior colleges developed by 1975 a growth rate of 3 percent per year during the next decade can be assumed for college enrollments as a percentage of 18-21 year olds.

If we increase the percentage that college enrollments are of the 18-21 year old group at a rate of 3 percent annually, 98 percent will be reached by 1975. (For later reference this is called Projection A.) It is likely however that as enrollments approach 100 percent of the college age group there will be smaller and smaller increments of gain in this percentage. This is so in part because not 100 percent of the 18-21 year olds will for one reason or another attend college. Those high school students not interested in college, those who have dropped out, and those unable to benefit from additional education form a ceiling, blocking the rise of the 18-21 year olds attending college from reaching 100 percent. On the other hand, it was pointed out earlier that it is entirely possible to exceed 100 percent of the 18-21 year group because there are some students in college under 18 and, in the universities especially, a large number over 21. Thus somewhere between the ceiling created by non-college-bound 18-21 year olds and increases in the number of college students under 18 and over 21 lies the best path of the projection.

Projection B therefore will represent a modified version of Projection A, assuming that as enrollments grow the rate of increase between years will lessen. This projection begins with a 4 percent increase in the percentage college enrollments are of the 18-21 year old group (this is slightly less than the average increase of the last five years) but reduces by annual increments to a one-half percent increase by 1975. The average annual increase for the next ten-year period up to 1975 will be less than two percent per year (less therefore than the slightly more than 2 percent increase of the last twenty-five years and less than half of the 5 percent increase of the last five years). These two projections appear in graph form in Figure 29 along with the projection of 18-21 population in Arizona (Line A of Figure 29).

FIGURE 29

PROJECTION OF 18 TO 21 YEAR OLDS AND
ENROLLMENT IN HIGHER EDUCATION IN ARIZONA
1960 — 1975



Projection A above forecasts the number of students enrolled in higher education within Arizona at 174,000 by 1975 and Projection B, with a more conservative rate of increase, at 153,000.

The year by year increase for both projections is shown in the table on the following page.

TABLE 22

Year	Projection A	Projection B
1966	72,838	73,866
1967	83,575	84,890
1968	92,614	93,820
1969	101,038	101,038
1970	114,902	109,470
1971	123,128	118,872
1972	136,129	128,464
1973	147,575	136,322
1974	159,847	143,828
1975	174,020	152,668

Enrollment Projections of Individual Institutions

In connection with this report, all institutions of higher education in Arizona were requested to project their enrollments on the basis of past trends to 1975. These enrollment projections are shown in Table 23 for individual institutions with a combined yearly total. Note that these yearly totals fall short of both Projection A and Projection B in Table 22 by a considerable margin. They are about 47,000 under Projection A and 26,000 under Projection B by 1975.

Actually the enrollments projected by the individual institutions follow a parallel path about 5,000 students higher than a projection which would result from *no annual increase* over the present percentage college enrollments are of the 18-21 year group. This is shown by the dotted line in Figure 29 labeled Projection C.

It is highly improbable that there will be no further increase in enrollments as a percentage of 18-21 year olds during the next decade. From what is known of the educational demands being placed upon individuals today by a highly technical and scientific society there is every reason to believe that demand for higher education will certainly not decrease; if anything, it will tend to increase. Further, as more junior colleges are built there will be consequent rises in the percentage that enrollments are of the 18-21 year group. This was clearly evident in Figure 11 presented on page 72.

TABLE 23

ENROLLMENT PROJECTIONS BY INDIVIDUAL INSTITUTIONS

1965 - 1975

	PUBLIC INSTITUTIONS									PRIVATE INSTITUTIONS			
Year	Arizona State Univ.	North. Arizona Univ.	Univ. of Arizona	Ariz. Western College	Cochise College	Eastern Arizona College	Glendale Commun. College	Mesa Commun. College	Phoenix College	American Institute for Foreign Trade	Grand Canyon College	Prescott College	TOTAL
1965	19198	5260	20361	1670	1215	890	1969	1369	12756	315	540	......	65,543
1966	20750	6104	21587	1830	1600	1100	3300	2850	12200	345	580	130	72,376
1967	22250	6847	22591	2100	1800	1200	4100	3300	12500	375	630	310	78,003
1968	23650	7623	23739	2310	2200	1320	4800	3900	12700	400	680	510	83,832
1969	24900	8330	24777	2650	2300	1320	5600	4400	12900	425	730	630	88,935
1970	26000	9087	26251	2910	2500	1380	6500	5000	13100	450	790	750	93,818
1971	27000	9994	27940	3340	2700	1530	7900	5450	13200	500	850	850	101,254
1972	28000	11002	29750	3670	2900	1673	8600	6250	13400	500	920	950	107,615
1973	29000	11961	31484	4220	3100	1800	9300	6900	13700	500	990	1000	113,955
1974	30000	13001	33426	4640	3200	1990	10000	7600	13900	500	1020	1050	120,777
1975	31000*	14100*	35576	5060*	3300	1990	10800*	8500*	14100*	500	1090	1200	127,116*

*Estimated by editor

The obvious conclusion is that Arizona institutions have underestimated their enrollment increases by a minimum of 26,000 students. A careful examination of Table 23 will reveal a very pronounced tendency on the part of most institutions to flatten their enrollment curves after the first two or three years of projection.

The fact that individual institutions may in some cases be greatly underestimating their enrollment increases is significant for several reasons.

1. It is important to realize that enrollment increases analyzed in the next section are conservative ones.
2. It is important to understand that the financial estimates made in the following section of this report based upon projections of enrollments are probably conservative and may need considerable adjustment within a five-year period.
3. It is important that all institutions in the state, both public and private, two-year colleges, four-year colleges, and the universites, be aware of the need for adjustment in their forecasts so that their plans for the future may be fully developed in advance.
4. It is important that public policy makers be aware of the probable growth of enrollments in the future so that the needs of higher education can be met adequately and on schedule.

Enrollments of the Universities to 1975

The combined enrollment projections for all twelve Arizona institutions of higher education, public and private, have been given in Table 23.

This section undertakes a more detailed analysis of enrollment characteristics of the projections of the universities. A section following this will do the same for junior college projections.

Full-Time Equivalent Enrollment Projections

A full-time equivalent student is an undergraduate student carrying 15 units or a graduate student carrying 10 units. The value of calculating enrollments in terms of full-time equivalent students is that it indicates more precisely than does a head count the instructional load of the institution and hence represents more accurately needs for faculty, facilities, and financing.

All students do not carry the same number of courses (or units). Some carry more and some less than average credit hour loads. A working student may enroll for only one course. A calculation of full-time equivalent students adds all part-time students to determine how many full-time students they represent.*

The more units students carry on an average the closer the full-time equivalent enrollment is to the head count of students. At an institution with a large number of commuting students the percentage that full-time equivalent students are of the head count is liable to be lower than on a campus not located in an urban area and hence not a commuting campus. Cost to the student is mainly responsible for this. A student paying the full cost of fees (and tuition) as well as room and board finds it to his financial advantage to carry as full a load as possible in order to complete his education in the prescribed time (normally four years of regular semesters, but two and a half to three with summer sessions included). The student who lives at home can carry a smaller number of units without the same economic penalty the student who lives away from home must experience.

The larger the metropolitan area in which the university is located the larger the percentage of commuting students is apt to be; consequently, the larger the number of part-time students there is liable to be. This can be seen very clearly in Table 24.

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*Actually the calculation is done by adding all student credit hours for undergraduates and dividing them by 15, and all graduate credit hours and dividing by 10.

TABLE 24

FULL-TIME EQUIVALENT AND HEAD COUNT ENROLLMENTS AT THE THREE UNIVERSITIES, SEPTEMBER, 1965

	Undergraduates			Graduates		
	Head Count	**Full-Time Equivalents**	**Percent FTE is of Head Count**	**Head Count**	**Full-Time Equivalents**	**Percent FTE is of Head Count**
Arizona State University	15068	13709	91	4130	2215	54
Northern Arizona University	4920	4837	98	340	177	52
University of Arizona	16186	15142	94	4175	3576	86
Totals	36174	33688	93	8645	5968	69

Arizona State University, in the largest metropolitan area, has a greater percentage of undergraduate part-time students than either of the other two institutions; the University of Arizona has the next largest percentage; and Northern Arizona, in the smallest metropolitan area, has the smallest percentage of part-time students.

In terms of graduates, however, the greatest percentage of part-time students is at Northern Arizona University, next Arizona State University, and finally the University of Arizona with the smallest percentage of part-time graduates.

In their projections of head counts and full-time equivalent students to 1974, the three institutions each see the relationship between head count and full-time equivalent students differently. This is apparent in Table 25.

Although undergraduate students will remain about the same at all three institutions, Northern Arizona University anticipates that it will have a larger proportion of full-time graduates in 1970 and 1974 than it presently has. This is in keeping with their new status as a university. As their graduate offerings grow it can be expected that more full-time graduate students will be attracted into programs. Arizona State University sees its percentage of part-time students staying the same in 1970 and 1974 as it is now. The University of Arizona anticipates a slight decrease in the percentage of full-time graduate students in its student body.

TABLE 25

FULL-TIME EQUIVALENTS AND HEAD COUNT PROJECTION, 1970

	Undergraduates			Graduate & Professional		
	Head Count	FTE	Percent	Head Count	FTE	Percent
Arizona State University	19900	18050	91	6100	3270	54
Northern Arizona University	7967	7728	97	1120	814	73
University of Arizona	19197	17661	92	7054	5965	85
TOTAL	47064	43439	92	14274	10049	70

FULL-TIME EQUIVALENTS AND HEAD COUNT PROJECTION, 1974

Arizona State University	22500	20580	91	7500	4020	54
Northern Arizona University	11199	10863	97	1802	1300	72
University of Arizona	22653	21001	93	10773	9082	84
TOTAL	56352	52444	93	20075	14402	72

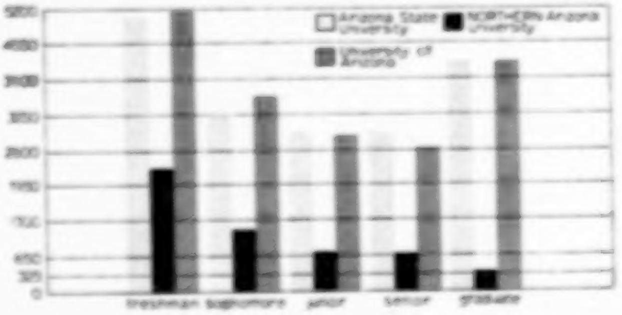
One of the reasons for a greater percentage of part-time graduates at Arizona State University and Northern Arizona University is that students majoring in education make up a larger part of graduate enrollments at these two schools than at the University of Arizona. Typically teachers employed in local school systems carry graduate courses in education to further their professional training. Most such enrollments are part-time, and lower the percentage of full-time equivalents to head count at the graduate level.

Projections of Enrollments by Classes

A distribution of enrollments (head count) of the three institutions, by classes, for September 1965 appears in the following graph.

FIGURE 30

ENROLLMENTS AT THE THREE UNIVERSITIES BY CLASSES
SEPTEMBER 1965



It can be noted in this graph that the sizes of different classes at Arizona State University and the University of Arizona are remarkably similar, with the University of Arizona having a somewhat larger number of freshmen and sophomores than Arizona State University and Arizona State University having a somewhat larger number of juniors and seniors than the University of Arizona. There is little doubt that this difference is attributable to the impact of the Maricopa junior college system upon Arizona State University. A similar shift would probably come about at the University of Arizona with the establishment of a junior college in Pima County.

Converted to percentages in Table 26 the pattern of distribution of students by classes for 1965, 1970, and 1974 is indicated for each institution.

TABLE 26

DISTRIBUTION OF CLASSES BY PERCENTAGES FOR SEPTEMBER 1965, 1970, AND 1974

	Freshmen		Sophomores		Juniors		Seniors		Prof. & Grad.	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Sept. 1965:										
Arizona State University	5089	27.7	3201	17.4	2993	16.3	2976	16.2	4130	22.5
Northern Arizona University	2260	43.4	1160	22.3	784	15.0	669	12.8	340	6.5
University of Arizona	5190	28.0	3684	19.9	2805	15.1	2698	14.5	4175	22.5
Total	12539	29.7	8045	19.1	6582	15.6	6343	15.0	8645	20.5
Sept. 1970:										
Arizona State University	5600	22.4	4000	16.0	4750	19.0	4600	18.4	6100	24.4
Northern Arizona University	3236	35.8	2031	22.5	1391	15.4	1251	13.9	1120	12.4
University of Arizona	5730	24.0	4410	18.5	3351	14.1	3303	13.9	7054	29.6
Total	14566	25.1	10441	18.0	9492	16.4	9154	15.8	14274	24.6
Sept. 1974:										
Arizona State University	5700	19.6	4100	14.1	5950	20.5	5800	20.0	7500	25.8
Northern Arizona University	4284	33.2	2815	21.8	2109	16.3	1895	14.7	1802	14.0
University of Arizona	7010	21.5	5375	16.5	4130	12.7	4119	12.6	11989	36.8
Total	16994	22.8	12290	16.5	12189	16.3	11814	15.8	21291	28.5

Following trends of the last decade, all three institutions see a smaller proportion of their enrollments in lower division (freshmen and sophomores) and a higher percentage in graduate enrollments. This is of course the pattern that enrollment increases should normally follow as more junior colleges become established within the state. A junior college in Pima or Coconino Counties would perhaps decrease lower division enrollments even more than is shown in these projections and after their first two years of operation raise upper division percentages more than are presently projected.

Enrollment Projections by Counties

In 1965 counties showed the following percentages of their 18-21 year old group attending the public institutions of Arizona.

TABLE 27

County	Percentage of College Age Population in Public Institutions of Higher Education
Apache	12.0
Cochise	44.4
Coconino	52.4
Gila	38.5
Graham	39.0
Greenlee	51.8
Maricopa	58.3
Mohave	20.3
Navajo	20.2
Pima	53.0
Pinal	22.9
Santa Cruz	35.4
Yavapai	41.9
Yuma	56.4

Note: Based upon 1960 census of county, 18-21 population with in- and out-migration estimated.

It can be noted that in those counties where there are one or more institutions of higher education the percentage of the 18-21 year population enrolled in colleges and universities is relatively high. The single two exceptions to this are Greenlee and Yavapai Counties which have high percentages of college attendance despite the fact that there are no institutions within the county.

The universities see some changes taking place in the distributions of their future students by counties. By 1975 Arizona State University and the University of Arizona anticipate greater percentages of their students to be from the counties in which they are located whereas Northern Arizona University sees greater percentages coming from Maricopa and Pima than has been the case in the past. This is in line with anticipated population patterns of the future. It is expected that principal growth will continue to be in the metropolitan areas of the state. If such continues to be the case it can be expected that the projections of the universities correctly anticipate larger proportions from the metropolitan areas.

Projections of Out-of-State Students

All three universities anticipate that percentages of out-of-state enrollments will change somewhat. Arizona State University sees its out-of-state enrollment rising from the present 14 percent of the student body to 15 percent by 1975. Northern Arizona University sees its percentage of out-of-state students dropping from the present 15 percent of the student body to 10 percent by 1975. The University of Arizona sees a drop of one percentage point from 18 percent currently to 17 percent by 1975.

One fact is certain; if the projected increases for graduate students at the three institutions are fulfilled, percentage of non-residents can stay constant or decrease only if decreases in non-residents take place at the undergraduate level. Typically graduate enrollments are much more heavily non-resident than are undergraduate enrollments. There are good reasons for this. It is sound educational policy to discourage students from obtaining all their degrees at the same institution. Educators recommend advanced degrees, particularly the doctorate, be done at an institution other than the baccalaureate-granting institution. This policy is followed nationally to insure that students are exposed to different theories, different frames of reference, and different faculty. It is common, therefore, for a Ph.D. candidate to select a school where the specialty with which the student is concerned is a strong graduate program. Very often this means seeking out a particular professor who is noted in his field. It is evident, therefore, that good practice requires many Arizona students seeking graduate degrees to go out of state to institutions where their specialties are emphasized. There must be, therefore, mobility between the states of this nation in order to provide the kinds of educational environments that will most profit the citizens of the different states.

Graduate students are important in another respect. From among them universities must hire the bulk of their faculty. But it is also sound educational policy not to recruit too heavily from one's own graduate students in order to prevent inbreeding of theories and practices. Thus, while an institution may be a heavy producer of graduate students it does not normally become a heavy consumer of its own output and still maintain its academic reputation. It is therefore dependent upon the output of other institutions to satisfy its faculty needs just as other schools are dependent in part upon it to satisfy theirs. Again there must be mobility in order to satisfy the staffing needs of institutions in the different states.

It follows, therefore, that not only does a university send the majority of its students seeking advanced degrees away from the campus, but it is prohibited by policy from recruiting too heavily among its own graduates for faculty. Therefore, graduate enrollments will of necessity be largely out-of-state students who upon graduation will go (if they become faculty) to other institutions to teach. Arizona undergraduates will go largely to other states for their graduate degrees.

It is obvious then unless these educational policies are abandoned in the coming years that as graduate enrollments grow the proportion of out-of-state students will increase and such increases can be offset only by decreases in the percentage of undergraduate enrollments.

Such decreases in undergraduate enrollments would have their special effects upon the institutions. It is pointed out in the last chapter that there are strong reasons for keeping a balance of out-of-state students at the universities. These reasons cover the educational environment, the economic advantages to the state, which includes not only the fact that out-of-state students help pay for the education of Arizona students but that they contribute heavily to the economics of the communities surrounding the institutions. Further, many out-of-state students remain in Arizona and become leaders and important taxpayers of the state. Many business leaders, outstanding citizens, and professional people are citizens of Arizona today because they were attracted to this state originally as students of the colleges and universities.

Junior College Enrollments

The student increases anticipated by individual junior colleges were shown in Table 23. This section will undertake to analyze those increases in terms of the characteristics of the student bodies. The following table shows junior college enrollments by head count and by full-time equivalent students for the last five years and projected to 1974.

TABLE 28
JUNIOR COLLEGE ENROLLMENTS
SEPTEMBER 1960 TO SEPTEMBER 1974

Year	Head Count	Percent Increase over Previous Yr.	Full-Time Equivalent Students	Percent Increase over Previous Yr.	Percent FTE is of Head Count
1960-61	6396		2832		44.3
1961-62	7282	13.9	3452	21.9	47.4
1962-63	8034	10.3	3786	9.7	47.1
1963-64	10630	32.3	5741	34.1	54.0
1964-65	19277	81.3	9308	62.1	48.3
1965-66	17869	3.0	12226	31.3	61.5
1966-67	22880	15.2	14477	18.4	63.3
1967-68	25000	9.3	15720	8.6	61.1
1968-69	27230	8.9	16940	7.8	62.2
1969-70	29170	7.1	18240	7.7	62.5
1970-71	31390	7.6	19720	8.1	61.4
1971-72	34120	8.7	21595	9.5	63.3
1972-73	36493	6.9	23108	7.0	63.3
1973-74	39000	6.9	24710	6.9	63.4
1974-75	41330	5.9	26240	6.2	64.5

It is immediately apparent that increases between 1966 and 1974 are of a much smaller order than increases have been for the last five years. These projections can be considered, therefore, conservative. It is also the case that these projections are only for existing junior colleges and would have to be adjusted upward for greater increases between now and 1974 when additional junior colleges are built, for certainly there will be within this time span at least four more junior colleges, some of which are now in different stages of planning.

The projections in Table 28 demonstrate statistically a point touched upon earlier. Note that the percentage full-time equivalents are of the head count represents a smaller percentage than that shown at the universities, which had in each case 90 percent or more full-time equivalents of head counts. This means that on the average a greater percentage of junior college students are part-time than at the universities. The average student credit hour load at the junior colleges in September 1965 was approximately nine and a quarter semester hours. At the universities it was on the average fourteen semester hours. This means roughly that junior college students on the average carry about one course less per semester than do university students, probably because a great percentage of junior college students are employed while they attend college; the fact that junior college students also pay low fees contributes to the number who are part-time. There has been a trend over the last five years toward a larger percentage of full-time students at the junior colleges. In 1960 for example, the average student load was six and two-thirds units contrasted to the nine and one-quarter in 1965, a rise of almost one full three-credit-hour course per student.

Projections of Junior College Enrollments by Programs

Of the two principal programs, transfer and terminal, by far the greater majority of students enroll in transfer programs. In 1965 about 81 percent of total junior college enrollments were in transfer curricula with 19 percent in terminal. This of course does not mean that 81 percent of junior college enrollees transfer to universities or four-year colleges since many do not complete two years of transfer work for one reason or another or do not go beyond the associate degree. It does mean however that a much larger percentage of junior college enrollees are in a position to transfer to universities or four-year colleges than are not. Nationally about two-thirds of junior college students plan to transfer. In the short run about one-third actually do. In the long run approximately 60 percent go on to four year colleges or universities.*

Forecasting the percentages of students who will enroll in terminal and transfer curricula by 1975 is difficult. The balance between the two will be tempered somewhat by developing needs of the state. If there is a greater trend toward industrialization and construction in Arizona there should be corresponding increases in terminal curricula enrollments. The present critical shortage of nurses within the state for example will no doubt result in higher enrollments in practical nursing programs in the future.

At those junior colleges some distance from the universities, terminal curricula represent a larger proportion of total enrollments than at those junior colleges within a short distance of universities. Thus Arizona Western College and Eastern Arizona College have 24 and 23 percent in terminal curricula whereas Maricopa Junior Colleges and Cochise College have 18 percent and 16 percent in terminal curricula. It would appear from this that students closer to universities and four-year colleges see greater probability of attending them than students at a greater distance. The economic probabilities of attending a university or four-year college are higher for the former group particularly where a university or four-year college is within commuting distance and board and room can be obtained at home.

Enrollment Projections by Counties

The following table demonstrates that the single largest group of students at any junior college are those who live in the county in which the junior college is located. There appear to be few out-of-state students enrolled at the junior colleges.

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*From a lecture by Dr. Raymond Young at the University of Arizona, June 23, 1966, entitled "The Junior College in America."

TABLE 29

	County	Other Counties	Out-of-State
Arizona Western College	1233	251	n/g
Cochise College*	549	140	26
Eastern Arizona College	244	464	n/g
Maricopa Junior College System	8305	168	n/g

*Day students only

n/g—not given

It can be expected that this condition will persist in future enrollments. By their natures, junior colleges are predominantly community colleges designed to fulfill the needs of the students within the county. Enrollments will always be primarily from the county in which the institutions are located. Free tuition for county students insures this. Out-of-state enrollments may be somewhat higher in those counties bordering other states. Cochise can be expected to attract some students from western New Mexico and northern Mexico. Arizona Western College at Yuma similarly will attract some students from eastern California and northern Mexico, but the percentage of such students will typically be very much lower than at the universities.

PROJECTIONS OF EDUCATIONAL COSTS

Operating Budgets of the Universities

The three universities have projected their operating budgets to 1974. The following tables show these projections, dividing the budgets into income from other sources (such as student fees and federal monies) and appropriated funds.

TABLE 30

ARIZONA STATE UNIVERSITY

ACTUAL AND PROJECTED OPERATING BUDGETS AND LEGISLATIVE APPROPRIATIONS

1960-61 THROUGH 1974-75

Fiscal Year	Enrollment		Operating Budget		Legislative Appropriations	
	Head Count	FTE	Amount	% Increase	Amount	% of Total Optg. Budget
1960-61	10,640	8,956	$ 7,735,129	9.6	$ 5,781,426	74.7
1961-62	12,049	9,903	8,763,343	15.3	6,537,450	74.6
1962-63	13,765	11,181	10,149,584	15.8	7,568,878	74.6
1963-64	15,419	12,454	12,127,847	19.5	8,821,547	72.7
1964-65	16,921	13,761	13,602,592	12.2	9,781,692	71.9
1965-66	19,198	15,924	15,214,705	11.9	10,817,205	71.1
1966-67	20,750	16,766	18,301,895	20.3	12,396,589	67.7
1967-68	22,250	18,245	21,881,000	19.6	14,879,080	68.0
1968-69	23,650	19,393	25,552,000	16.8	17,375,360	68.0
1969-70	24,900	20,418	29,557,000	15.7	20,098,760	68.0
1970-71	26,000	21,320	33,907,000	14.7	23,056,760	68.0
1971-72	27,000	22,140	38,685,000	14.1	26,305,800	68.0
1972-73	28,000	22,960	44,075,000	13.9	29,971,000	68.0
1973-74	29,000	23,780	50,153,000	13.8	34,104,000	68.0
1974-75	30,000	24,600	57,000,000	13.7	38,760,000	68.0

TABLE 31

NORTHERN ARIZONA UNIVERSITY

ACTUAL AND PROJECTED OPERATING BUDGETS AND LEGISLATIVE APPROPRIATIONS

1960-61 THROUGH 1974-75

Fiscal Year	Enrollment Head Count	Enrollment FTE	Operating Budget Amount	Operating Budget % Increase	Legislative Appropriations Amount	Legislative Appropriations % of Total Optg. Budget
1960-61	2,069	1,984	$ 1,518,981	11.3	$ 1,172,426	77.2
1961-62	2,395	2,346	1,916,059	26.1	1,398,909	73.0
1962-63	2,869	2,715	2,390,930	24.8	1,857,330	77.7
1963-64	3,377	3,186	2,929,570	22.5	2,224,110	75.9
1964-65	4,003	3,868	3,404,710	16.2	2,584,760	75.9
1965-66	5,260	5,014	4,099,280	20.4	3,067,430	74.8
1966-67	6,104	5,786	5,492,465	34.0*	4,081,615	73.7
1967-68	6,847	6,458	6,378,611	16.0	4,739,308	73.7
1968-69	7,623	7,183	7,379,150	16.7	5,482,708	73.7
1969-70	8,330	7,840	8,386,556	13.7	6,231,211	73.7
1970-71	9,087	8,542	9,513,381	13.4	7,068,442	73.7
1971-72	9,994	9,383	10,869,950	14.3	8,076,373	73.7
1972-73	11,002	10,318	12,429,209	14.3	9,234,902	73.7
1973-74	11,961	11,198	14,040,298	13.0	10,431,941	73.7

*Northern Arizona University has been realizing the largest growth of the universities in the ten western states in recent years, which does affect the percentage of the budget increase.

TABLE 32

UNIVERSITY OF ARIZONA

ACTUAL AND PROJECTED OPERATING BUDGETS AND LEGISLATIVE APPROPRIATIONS 1960-61 THROUGH 1974-75

Fiscal Year	Enrollment		Operating Budget		Legislative Appropriations	
	Head Count	FTE	Amount	% Increase	Amount	% of Total Optg. Budget
1960-61	12,518	11,170	$13,257,912	14.3	$ 8,867,606	66.9
1961-62	13,950	12,460	15,356,251	15.8	9,916.457	64.6
1962-63	15,762	13,896	17,324,444	12.8	10,995,743	63.5
1963-64	17,210	15,350	19,119,624	10.4	12,364,778	64.7
1964-65	18,735	16,858	21,002,433	9.8	13,516,905	64.4
1965-66	20,361	18,718	23,465,186	11.7	15,338,184	65.6
1966-67	21,587	19,418	26,336,141	12.2	17,149,217	65.1
1967-68	22,591	20,332	29,759,839	13.0	19,641,494	66.0
1968-69	23,739	21,365	33,033,421	11.0	21,802,058	66.0
1969-70	24,777	22,299	36,336,763	10.0	23,982,264	66.0
1970-71	26,251	23,626	40,333,806	11.0	26,620,312	66.0
1971-72	27,940	25,146	44,972,193	11.5	29,681,647	66.0
1972-73	29,750	26,775	50,368,856	12.0	33,243,445	66.0
1973-74	31,484	28,336	55,909,430	11.0	36,900,224	66.0
1974-75	33,426	30,083	61,500,373	10.0	40,590,246	66.0

Combined operating budgets for the three universities projected to 1974 appear below.

TABLE 33

COMBINED OPERATING BUDGETS, ARIZONA STATE UNIVERSITY, NORTHERN ARIZONA UNIVERSITY, UNIVERSITY OF ARIZONA—ACTUAL AND PROJECTED AND LEGISLATIVE APPROPRIATIONS 1960-61 THROUGH 1974-75

Fiscal Year	Enrollment		Operating Budget		Legislative Appropriations	
	Head Count	FTE	Amount	% Increase	Amount	% of Total Optg. Budget
1960-61	25,227	22,110	$ 22,512,022	12.4	$15,821,458	70.3
1961-62	28,394	24,709	26,035,653	15.7	17,852,816	68.6
1962-63	32,396	27,792	29,864,958	14.7	20,421,951	68.4
1963-64	36,006	30,990	34,177,041	14.4	23,410,435	68.5
1964-65	39,659	34,397	38,009,735	11.2	25,883,357	68.1
1965-66	44,819	39,656	42,779,171	12.5	29,222,819	68.3
1966-67	48,441	41,970	50,130,501	17.2	33,629,421	67.1
1967-68	51,688	45,035	58,019,450	15.7	39,259,882	67.1
1968-69	55,102	47,941	65,964,571	13.7	44,660,126	67.7
1969-70	58,007	50,557	74,280,319	12.6	50,312,235	67.7
1970-71	61,338	53,488	83,754,187	12.8	56,745,514	67.8
1971-72	64,934	56,669	94,527,143	12.9	64,063,820	67.8
1972-73	68,752	60,053	106,873,065	13.1	72,449,347	67.8
1973-74	72,445	63,314	120,102,728	12.4	81,436,205	67.8
1974-75	76,427	66,846	134,368,847	11.9	91,140,522	67.8

Over the last decade there has been an average increase of 16.8 percent per year in the combined totals of the three operating budgets of the universities. During the period of the projection, average increases in the combined operating budgets will be 13.1 percent. Thus the average increase per year is less during the eight projected years than it has been for the last ten years of actual appropriations by about 3.7 percentage points per year.

The three institutions also see a smaller proportion of their total operating budgets coming from state appropriations and a larger proportion coming from student fees and other collections than has been the case in the past. Between 1960-61 and 1966-67 the average percentages of the total combined budget of the three institutions deriving from legislative appropriations was 68.5 percent. During the period of the projection the average percentage coming from state appropriations has been estimated to be 67.8.

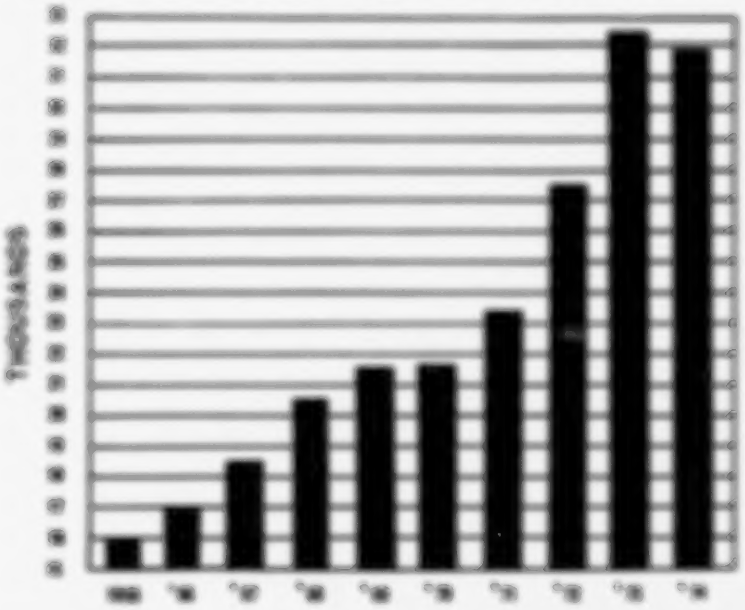
These operating budget increases appear to be conservative for a number of reasons. The chief item of expenditure in the operating budget is salary for faculty and staff. From what is known of trends over the last five years in the hiring and retention of faculty and from what can be anticipated of the ratio of future Ph.D. holders to future staffing needs, salaries at educational institutions will continue to rise at as fast or faster a pace in the future as they have in the past.

One of the most critical issues the universities must face in the next decade is the problem of obtaining faculty to meet the needs of growing enrollments. It is not a problem of quantity alone, although that in itself will pose some serious challenges. Projections by the United States Office of Education indicate a demand from institutions of higher education for 64,000 new full-time equivalent teachers a year by 1974-75.[2] All indications of advanced degree production to meet these needs suggest that the shortage of qualified faculty will become increasingly acute in the decade ahead.

Figure 31 indicates that by 1974 there will be 31,000 Ph.D. holders graduated in this country. About 60 percent of these will go into teaching in higher education. This means that about 19,000 will be available to satisfy the demand for 64,000 teachers

FIGURE 31

PROJECTIONS OF DOCTORAL DEGREES ANTICIPATED IN THE UNITED STATES



SOURCE: PROJECTIONS OF EDUCATIONAL STATISTICS TO 1974-75

in higher education. Thus by 1974 about 70 percent of the teachers hired by institutions of higher education will not have doctoral degrees unless something occurs to change the number of Ph.D. holders available in 1974 or unless something occurs to lower the demand for teachers by 1974.

A 1963 report by the Organization for Economic Co-operation and Development, studying the problems of higher education in this country, comments:

> ". . . the likelihood is that either quality or quantity of teaching in higher education is severely threatened. If a seriously unsatisfactory situation is to be avoided drastic measures are required. The Office of Education estimated, for example, that the annual expenditure on graduate fellowships which amounted to $35-million in 1960 would

> have to be at least doubled. The Office also believes that a doubling of average salaries will be necessary if the required number and quality of staff is to be attracted . . . .[79]

As the shortage of qualified personnel becomes more and more apparent it will become increasingly difficult to staff Arizona institutions with the kind of teaching personnel necessary to provide the level of education Arizona citizens should get. An institution is excellent on the strength of its faculty. This is the single element in education that cannot be subject to stringent economies. In order to provide excellence in education, men of quality must be attracted and held. In order to attract this kind of individual the universities and colleges must be in a position to compete for the outstanding people. It has already become apparent in recruiting that unless a salary can be made competitive, only the second and third rate can be attracted.

The following tables provide distributions of full-time equivalent teaching faculty by colleges and schools for each of the three universities. Projections were made on the basis of a formula of one full-time faculty for each 22 full-time students established by the Board of Regents. Full-time equivalent teaching faculty is computed in these tables on the basis of two half-time positions equalling one full-time position. All levels of teaching faculty are represented including graduate assistants and associates. Increases from year to year show only additional teaching positions required to support increases in enrollments. These increases do not reflect the full recruiting needs of the universities. In addition to these, replacements must be found for faculty leaving or retiring.

Increases at the three institutions amounted to 229.4 full-time equivalent teaching faculty between 1965-66 and 1966-67. By 1974-75 these increases drop to 143.4 for the three institutions bringing the total teaching faculty at the universities to 3,055.5 in 1974-75. The diminishing of the rate of increase in new full-time teaching faculty is due to the flattening of enrollment growth as it reaches the end of the decade. Obviously, should these full-time equivalent projections be too conservative the number of faculty needed would increase.

TABLE 34
ARIZONA STATE UNIVERSITY
BUDGETED AND PROJECTED FULL-TIME EQUIVALENT TEACHING PERSONNEL BY COLLEGE
1960 THROUGH 1974

Year	Architecture	Business Adminis.	Education	Engineering Sciences	Fine Arts	Law	Liberal Arts	Nursing	Grad. School of Soc. Serv. Administration	Grad. School of Library Sciences	University Totals
1960	8.60	59.00	46.05	67.40	42.00	......	216.40	14.95	......	......	454.40
1961	8.60	56.90	49.53	67.30	41.92	......	217.15	14.95	......	......	456.35
1962	13.85	62.55	58.35	75.80	49.25	......	232.95	16.95	1.00	......	510.70
1963	16.85	72.70	78.90	99.17	58.50	......	325.98	20.00	4.00	......	674.10
1964	19.10	75.70	88.50	108.17	64.75	......	360.16	23.00	5.25	......	744.63
1965	20.50	80.70	91.50	111.17	71.25	1.00	378.49	23.00	5.25	......	782.86
1966	22.50	92.00	98.25	117.00	78.50	6.75	437.46	23.00	5.20	......	878.66
1967	23.00	104.00	105.00	119.00	83.00	7.00	475.00	24.00	6.00	......	946.00
1968	23.00	110.00	112.00	122.00	88.00	10.00	502.00	25.00	6.00	......	998.00
1969	23.00	115.00	113.00	125.00	94.00	13.00	524.00	26.00	7.00	5.00	1045.00
1970	24.00	123.00	119.00	129.00	95.00	14.00	542.00	28.00	7.00	5.00	1086.00
1971	24.00	129.00	125.00	132.00	98.00	15.00	558.00	30.00	8.00	5.00	1124.00
1972	25.00	134.00	129.00	136.00	99.00	16.00	578.00	32.00	9.00	5.00	1161.00
1973	25.00	139.00	134.00	138.00	101.00	17.00	595.00	34.00	9.00	6.00	1198.00
1974	25.00	143.00	138.00	140.00	104.00	18.00	615.00	38.00	10.00	6.00	1235.00

TABLE 35
NORTHERN ARIZONA UNIVERSITY
NUMBER OF FACULTY BY DIVISION
1960-1974

Year	Business	Education	Forestry	Liberal Arts	Sciences	Technology	Total
1960	8.25	15.84	4.67	31.84	14.34	9.54	84.48
1961	10.33	20.80	5.67	35.22	20.25	12.54	104.81
1962	12.50	22.22	5.67	46.22	23.50	13.75	123.86
1963	13.00	24.85	5.67	57.13	35.67	14.50	150.82
1964	14.75	31.19	6.67	60.47	44.55	18.09	175.72
1965	17.14	34.79	7.14	69.81	50.22	19.62	198.72
1966	20.25	39.50	7.75	82.00	57.61	21.61	228.72
1967	23.35	44.21	8.36	94.20	64.99	23.61	258.72
1968	25.63	47.66	8.80	103.15	70.40	25.08	280.72
1969	27.08	49.86	9.08	108.85	73.84	26.01	294.72
1970	28.83	52.54	9.42	115.77	78.02	27.14	311.72
1971	30.99	55.84	9.84	124.33	83.18	28.54	332.72
1972	33.35	59.45	10.30	133.71	88.84	30.07	355.72
1973	35.51	62.74	10.72	142.28	94.00	31.47	376.72
1974	37.77	66.17	11.17	151.27	99.41	32.93	398.72

Graduate Assistants in Teaching

It has been the trend nationally, particularly at universities, to rely more and more upon graduate students to assist in the teaching programs of the institutions. There are a number of reasons for this trend. The first and primary reason is the economy of using well qualified graduate students to assist in laboratories, discussion sections, and lower division courses, and to perform other duties in connection with the teaching program of the institution. In addition to this economic benefit the gradu-

TABLE 30
UNIVERSITY OF ARIZONA
DISTRIBUTION OF FULL-TIME EQUIVALENT TEACHING FACULTY BY COLLEGES
1960 - 1974

Year	Agri.	Arch.	BPA	Educ.	Engrg.	Fine Arts	Law	Lib. Arts	Medicine	Mines	Nurs.	Pharm.	Gen'l. Depts.	Other	UNIV. TOTAL
1960-61	22.8	*	40.1	28.1	40.5	33.8	5.7	224.2	——	19.0	12.7	4.9	28.2	1.5	459.5
1961-62	24.7	*	43.4	30.5	43.8	36.7	6.1	242.8	——	20.5	13.7	5.3	28.4	1.6	497.3
1962-63	27.4	*	48.2	33.8	48.6	40.5	6.8	269.1	——	22.7	15.2	5.9	31.5	1.8	551.5
1963-64	31.0	*	54.6	36.3	55.1	46.0	7.7	305.3	——	25.8	17.3	6.6	35.7	2.1	625.5
1964-65	33.7	7.8	59.3	41.5	59.8	42.1	8.3	331.2	——	28.0	18.7	7.2	38.7	2.2	678.5
1965-66	37.2	8.6	65.5	45.7	66.0	46.6	9.3	365.8	——	30.9	20.7	7.9	42.8	2.5	749.5
1966-67	42.3	9.8	74.4	52.1	75.0	52.8	10.5	410.0	——	35.1	23.5	9.0	48.7	2.9	852.1
1967-68	44.3	10.3	78.0	54.7	78.7	55.4	11.0	436.2	10**	36.8	24.7	9.5	51.0	2.9	903.5
1968-69	46.6	10.8	82.1	57.6	82.9	58.3	11.6	459.1	20**	38.8	26.0	10.0	53.7	3.1	960.6
1969-70	48.7	11.3	85.8	60.2	86.6	61.0	12.1	479.8	40**	40.5	27.1	10.4	56.1	3.2	1023.1
1970-71	51.8	12.0	91.1	63.9	91.9	64.7	12.8	509.3	60**	43.0	28.8	11.1	59.6	3.4	1103.4
1971-72	55.2	12.8	97.1	68.1	98.0	69.0	13.7	543.0	70**	45.8	30.7	11.8	63.5	3.7	1182.4
1972-73	58.8	13.6	103.6	72.6	104.6	73.6	14.6	579.7	75**	48.9	32.7	12.6	67.7	3.9	1261.9
1973-74	62.4	14.5	109.8	77.0	110.8	78.0	15.5	613.7	80**	51.8	34.7	13.3	71.8	4.1	1337.4
1974-75	66.4	15.3	116.7	81.8	117.8	82.9	16.4	652.5	85**	55.1	36.9	14.3	76.3	4.4	1421.8

*Included in Fine Arts.

**The faculty for the Medical College is not computed as part of the 22 to 1 ratio for full-time equivalent faculty.

ate student by reason of the experience he gains as a laboratory assistant is qualifying himself professionally just as the practice teacher in public schools qualifies through an internship of teaching. Studies have shown that a great number of graduate students who have elected to make teaching their careers have done so as a result of their exposure to teaching in their graduate years.

A further reason results from the growing critical shortage of teachers for higher education. Industry, business, and the government are difficult competitors for the output of colleges and universities. Increasingly institutions find that not only are they losing their bids for new teachers but that many of their current faculty are being attracted by higher salaries elsewhere. Under such a condition it is little wonder that the trend has been toward use of more and more graduate students in the teaching programs.

Graduate training is expensive for a master's or doctoral candidate, and the income he derives from a graduate assistantship is usually all that supports him during his student days. Thus graduate assistantships not only assist the university in its operation, improve the graduate student professionally, attract more teachers of higher education into the profession, but also help support the graduate student while he obtains his degree.

A good quality of instruction is maintained at most institutions with graduate assistants by close supervision from the faculty of the department in which the graduate student teaches. Faculty members are usually appointed by the department head to supervise discussion and lecture sections taught by graduates, and to advise them in teaching matters. Laboratory sections taught by graduates are closely supervised and planned by the faculty member responsible for the course.

It can be anticipated that as enrollments in higher education increase and as shortages of faculty persist that institutions will turn increasingly to graduate students for the teaching support needed for the instructional programs of the institutions.

Projections of Operating Costs at the Junior Colleges

From questionnaires submitted by the junior colleges the following estimate of operating budgets was obtained.

TABLE 37

PROJECTIONS OF OPERATING BUDGETS, JUNIOR COLLEGES 1966-1975

Year	Arizona Western College	Cochise College*	Eastern Arizona College	Maricopa Jr. College System	Total	Percent Increase over Previous Year
1966-67	$1,178,610	$ 925,000	$ 806,295	$ 7,462,800	$10,372,705	
1967-68	1,296,470	1,017,500	896,924	8,055,450	11,256,344	8.5
1968-69	1,426,138	1,110,000	931,270	8,608,275	12,065,683	7.2
1969-70	1,568,752	1,295,000	977,833	9,161,100	13,002,685	7.8
1970-71	1,625,627	1,490,000	1,026,724	9,871,875	14,004,226	7.7
1971-72	1,738,190	1,572,500	1,078,060	10,858,725	15,247,475	8.9
1972-73	1,966,909	1,665,000	1,131,963	11,569,500	16,333,372	7.1
1973-74	2,163,600	1,757,500	1,188,551	12,241,125	17,350,776	6.2
1974-75	2,617,956	1,850,000	1,247,978	12,872,925	18,588,859	7.1
1975-76	2,879,752	1,924,500	1,310,367	13,504,725	19,637,344	5.6

*Estimated on basis of $925 cost per full-time equivalent student.

These projections of operating costs appear somewhat conservative in view of the trend toward increasing costs per full-time equivalent student nationally as a result of the general rise of living costs. Higher teachers' salaries and increased costs of supplies and materials suggests that the cost per full-time equivalent student will tend to rise in the next decade. According to these projections, however, costs drop from $716 per full-time equivalent student in 1966 to $708 per full-time equivalent student in 1975. On the other hand, increased enrollments may bring about a decrease in the cost per full-time equivalent student during this period.

State and District Costs per Full-Time Equivalent at Junior Colleges

It was indicated earlier that the state appropriates about 50 percent of the operating costs of the junior colleges and the district provides about 39 percent. The balance comes from student fees and miscellaneous sources.

The following table divides the projected operating expenses of the junior colleges according to those percentages. It should be borne in mind that these projections of operating expenses are for existing junior colleges only. Any additional junior colleges opened during the period 1966 to 1975 would increase these estimates accordingly.

TABLE 38

Year	Total Operating Budget	State Appropriation	County Appropriation	Other Sources
1966-67	$10,372,050	$5,186,025	$4,045,100	$1,140,925
1967-68	11,256,344	5,628,172	4,389,974	1,238,198
1968-69	12,065,683	6,032,842	4,705,616	1,327,225
1969-70	13,002,685	6,501,343	5,071,047	1,430,295
1970-71	14,004,226	7,002,113	5,461,648	1,540,465
1971-72	15,247,475	7,623,738	5,946,515	1,668,222
1972-73	16,333,372	8,166,686	6,370,015	1,796,671
1973-74	17,350,776	8,675,388	6,766,803	1,908,585
1974-75	18,588,859	9,294,429	7,249,655	2,044,774
1975-76	19,637,344	9,818,672	7,658,564	2,160,108

Projections of Capital Outlay at the Universities

In Chapter III it was shown that all three institutions are presently facing serious shortages of space on their campuses. This was shown by comparison with two sets of norms for floor space per full-time equivalent student. In the first comparison (the California standards) each of the Arizona universities had just slightly over one-half of the space recommended by the standards. In the second comparison (the Doi-Scott norms) it was shown that Arizona State University and University of Arizona had less floor space in classrooms and laboratories than 90 percent of the institutions comprising the norms. In the case of lecture rooms, the University of Arizona had less floor space than any institution in the norms. In the case of laboratories only one institution in the norms had less floor space than Arizona State University.

There can be little doubt that an extensive building program is needed for all three schools to bring their total floor space up to a point where the educational programs of the three institutions can be provided the amounts of floor space they need for effective and efficient operation.

Present lacks of floor space have serious implications for the educational programs. Faculty office space, for example, at all three institutions is in very serious shortage. Northern Arizona University in its material submitted the following statement. "Our most critical problems lie in the lack of faculty office space. . . . We have two and three faculty housed in an office built for one, and still we are short at least 70 offices for next fall not considering the overload of present offices. There will be no new classrooms, offices or laboratories available for 1966; so the overcrowded conditions will become more pronounced next fall."

Arizona State University and University of Arizona are both experiencing the same kind of shortages of office space. Both are renting space on the periphery of their campuses to temporarily relieve the problem. The fact is apparent that unless a strong building program is initiated in the very near future the problem will get worse rather than better. Between Sept. 1964 and Sept. 1965 the net square feet per full-time equivalent student fell at all three institutions. This is direct evidence that the present building program is not adequate to support the enrollment increases that are now being experienced at the three institutions. Unless a large scale building program can be launched, the results of floor space shortages are obvious. Enrollments will have to be curtailed at that point where floor space can no longer support further increases.

Floor space needs for Arizona State University and University of Arizona are calculated with 120 net square feet per full-time equivalent student as the objective to be reached by the end of the projection period. Northern Arizona University summarizes its situation as follows. "For the projected FTE student enrollment of 13,163 for fall 1975, the recommended assignable square feet per student is 124.2. This space could be used to good advantage, but the economic aspects associated with the projected rapid growth have prompted the proposal of 105 assignable square feet per student for Northern Arizona University."

Costs of floor space needed by the three institutions were calculated in the following manner. Using goals of 120 and 105 net square feet per full-time equivalent student, projections of net square feet were made to bring each school to its goal by the end of the projection. Gross square footage was then calculated by allowing for corridors, stairwells, heating and cooling equipment rooms, janitor facilities, and rest room space, which is not part of net assignable square footage. To these gross square feet projections a scale of building costs was applied that followed the rising cost of construction for the last ten years.

From this schedule of construction costs per gross square foot for the next ten years, each institution has developed a cost schedule by years to 1974 or 1975, allowing for building construction, remodeling, utilities, and land. These are shown on Table 39.

TABLE 39
SUMMARY OF CAPITAL OUTLAY REQUIREMENTS AND ESTIMATED AID FROM OUTSIDE SOURCES

Legislative Year	Buildings*	Remodeling & Utilities	Land	Total	Estimated from Other Sources	Estimated Appropriation
ARIZONA STATE UNIVERSITY:						
1966-67	$ 5,883,991	$ 537,000	$1,000,000	$ 7,420,991	$1,539,176	$ 5,881,815
1967-68	6,945,000	300,000	2,000,000	9,245,000	2,315,000	6,930,000
1968-69	5,569,500	1,110,000	1,200,000	7,879,500	1,856,253	6,023,247
1969-70	5,569,000	700,000	......	6,269,000	1,856,000	4,413,000
1970-71	8,911,000	......	......	7,306,000	1,187,000	6,119,000
1971-72	12,600,000	......	......	12,600,000	2,355,000	10,245,000
1972-73	13,079,500	......	......	13,079,500	2,382,300	10,697,200
1973-74	4,717,800	......	......	4,717,800	1,572,500	3,145,300
1974-75	4,915,800	......	......	4,915,800	1,638,000	3,277,800
NORTHERN ARIZONA UNIVERSITY:						
1966-67	$ 4,966,667	$ 600,000	$ 50,000	$ 5,616,667	$ 666,667	$ 4,950,000
1967-68	4,437,500	......	......	4,437,500	600,000	3,837,500
1968-69	4,532,800	......	50,000	4,582,800	600,000	3,982,800
1969-70	4,662,060	175,000	......	4,837,060	600,000	4,327,060
1970-71	4,105,520	1,100,000	......	5,205,520	600,000	4,605,520
1971-72	4,827,517	......	......	4,827,517	600,000	4,227,517
1972-73	5,562,368	......	......	5,562,368	600,000	4,962,368
1973-74	5,260,500	......	50,000	5,310,500	600,000	4,710,500
1974-75	5,481,000	......	50,000	5,531,000	600,000	4,931,000

NOTE: Table 39 is continued on the following page.

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*Does not include space acquired through local bonding.

TABLE 39
(Continued)
SUMMARY OF CAPITAL OUTLAY REQUIREMENTS AND ESTIMATED AID FROM OUTSIDE SOURCES
UNIVERSITY OF ARIZONA:

Legislative Year	Buildings*	Remodeling & Utilities	Land	Total	Estimated from Other Sources	Estimated Appropriation
1966-67	$12,840,000	$ 595,000	$1,000,000	$14,435,000	$6,020,000	$ 8,415,000
1967-68	16,855,000	850,000	1,000,000	18,705,000	9,000,000	9,705,000
1968-69	9,032,000	1,540,000	1,000,000	11,572,000	1,500,000	10,072,000
1969-70	7,578,000	1,560,000	1,000,000	10,138,000	1,500,000	8,638,000
1970-71	9,200,000	1,240,000	1,000,000	11,440,000	1,500,000	9,940,000
1971-72	11,233,300	2,128,000	1,000,000	14,361,300	2,000,000	12,361,300
1972-73	11,453,800	2,088,000	......	13,541,800	2,000,000	11,541,800
1973-74	12,222,600	1,935,000	......	14,157,600	2,000,000	12,157,600
1974-75	12,717,200	2,225,000	......	14,942,200	2,000,000	12,942,200

*Does not include space acquired through local bonding.

The combined totals, estimated outside support, and appropriation needed from the state for capital outlay needs at all three universities follow.

TABLE 40

Legislative Year	Total Amount Needed	Estimated Outside Support	Estimated Appropriation
1966-67	$27,472,658	$ 8,225,843	$19,246,815
1967-68	32,387,500	11,915,000	20,472,500
1968-69	24,034,380	3,956,253	20,078,047
1969-70	21,244,060	3,956,000	17,288,060
1970-71	23,951,520	3,287,000	20,664,520
1971-72	31,788,817	4,955,000	26,833,817
1972-73	32,183,668	4,982,300	27,201,368
1973-74	24,185,900	4,172,500	20,013,400
1974-75	25,389,000	4,238,000	21,151,000

These then are the amounts needed to provide for the institutions over the next decade the square feet of floor space, utilities, and land needed to support anticipated enrollments at the universities. Outside support is estimated to come primarily from the federal government in the form of assistance through the Higher Education Facilities Act. It has been assumed that the Act will remain in force throughout the projected period with approximately the same amount of support that is currently available.

Projections of Capital Outlay at the Junior Colleges

Capital outlay expenditures for the next ten years were also requested in the questionnaire answered by the junior colleges. Capital outlay comes from the state in the form of an appropriation per full-time equivalent student and from county and auxiliary enterprise bonds. The following table gives capital outlay expenditures anticipated by the junior colleges to 1975 and includes state appropriations at the rate of $115 per full-time equivalent student and, in all but the case of Cochise College, funds from other sources such as the county, and the federal government, which under the Higher Education Facilities Act provides funds for construction at all institutions of higher education.

TABLE 41

CAPITAL OUTLAY PROJECTIONS FOR ARIZONA JUNIOR COLLEGES
1966 TO 1974

Year	Arizona Western College State	Arizona Western College Other	Cochise College* State	Eastern Arizona College State	Eastern Arizona College Other	Maricopa Junior College System State	Maricopa Junior College System Other	TOTAL State	TOTAL Other**
1966-67	$142,600	$ 157,400	$115,000	$122,130	$ 2,393	$1,285,125	$1,229,875	$1,664,855	$1,389,668
1967-68	163,300	486,700	126,500	127,650	9,325	1,390,350	1,124,650	1,807,800	1,620,675
1968-69	179,400	170,600	138,000	140,300	8,523	1,490,400	1,024,600	1,948,100	1,203,723
1969-70	205,850	169,150	161,000	140,300	10,714	1,590,450	924,550	2,097,600	1,104,414
1970-71	225,400	1,474,600	184,000	147,200	11,364	1,711,200	1,288,800	2,267,800	2,774,764
1971-72	258,750	166,250	195,500	164,450	2,042	1,864,725	1,135,275	2,483,425	1,303,567
1972-73	284,050	1,165,950	207,000	180,895	......	1,985,475	1,014,525	2,657,420	3,484,042
1973-74	326,600	123,400	218,000	195,500	......	2,101,050	898,950	2,841,150	1,022,350
1974-75	358,800	141,200	230,000	217,350	......	2,211,450	788,550	3,017,600	929,750

*State appropriation based on full-time equivalent enrollment projections only. Amount from other sources not estimated.

**Does not include funds which will be required by Cochise College from other sources.

Projections of Public Support

Projected combined operating and capital needs of the universities and junior colleges in terms of support from the counties and state are shown in the following table with the sources indicated.

TABLE 42

ESTIMATED SUPPORT NEEDED FOR HIGHER EDUCATION IN ARIZONA 1966-74

Year	State	Counties	TOTAL
1966-67	$ 59,727,116	$ 5,434,768	$ 65,162,000
1967-68	67,168,354	6,010,649	73,179,000
1968-69	72,719,195	5,909,339	78,629,000
1969-70	76,199,238	6,175,461	82,375,000
1970-71	86,679,947	8,236,412	94,916,000
1971-72	101,004,800	7,250,082	108,255,000
1972-73	110,474,821	9,854,057	120,329,000
1973-74	112,966,143	7,789,153	120,755,000
1974-75	124,603,551	8,179,405	132,783,000

PROJECTIONS OF PUBLIC FINANCES

Trends in Arizona Revenues and Expenditures

Attention is focused on the sources of revenue and the expenditures of Arizona's general fund. This is the fund from which expenditures for higher education are made. From 1950 to 1965 general fund revenues and general fund expenditures both grew at the average rate of 84% per five-year period. (See Table 43.) However, expenditures for higher education grew at a faster rate. On the average they doubled every five years from 1950 to 1965.

TABLE 43

ARIZONA GENERAL FUND REVENUE AND EXPENDITURE ACTUAL DATA AND PROJECTIONS BY SELECTED FISCAL YEARS

(Millions of Dollars)

Fiscal Years	Total Revenue	Total Taxes	Total Non-Tax Revenue	Univ. & College Collections	Total Expenditures	Total for Education	Total for Higher Education
1950	$ 27.9	$ 23.7	$ 4.2	$ 2.4	$ 27.5	$ 19.8	$ 8.1
1955	46.0	40.1	5.9	2.2	39.3	25.2	9.3
1960	111.8	99.0	12.8	6.3	97.1	69.3	25.6
1965	161.8	138.6	23.2	13.0	157.9	115.4	53.6
Increase %							
1950-55	65%	69%	41%	-8%	43%	27%	15%
1955-60	143	147	117	186	147	175	175
1960-65	45	40	81	106	63	67	109
Average	84%	85%	80%	95%	84%	90%	100%
Projections							
1970	$297.7	$256.4	$ 41.8	$ 25.4	$290.5	$219.3	$107.2
1975	547.8	474.3	75.2	49.5	534.5	416.7	214.4

Source: Arizona State Auditor, *Annual Reports* except for projections.

On the other hand, university and college collections grew at the rate of 95% every five years. Recent increases in student fees, however, will likely speed up this rate of increase even more.

If expenditures for higher education continue to double every five years, they will grow from a total of $53.6 millions in 1965 to $107.2 millions in 1970 and $214.4 millions in 1975. Since general fund revenues are growing at a slower rate (84% per five years), one or more of several alternatives must happen. There could be a decrease in the rate at which expenditures for higher education are increasing. In view of enrollment increases, this seems unlikely. There could be slower rates of increase for other items of expenditure from the general fund. These include general government, the state hospital, correctional institutions, welfare and other items. This seems unlikely too. An alternative is to find ways of increasing general fund revenues.

Arizona shares the national tendency for the expenditures of state governments to take an increasing percentage of personal income. (See Table 44.) In 1965 the State of Arizona spent an amount equal to 11.8% of its citizens' personal income. This is considerably higher than the national average of 8.6%.

One reason why Arizona is above the national average of state expenditure as a percentage of personal income is the relatively greater expenditure for highways. Like other western states Arizona has proportionately few people in a relatively large area. This raises the cost of highways per capita. But a great deal of this higher cost is offset by larger grants-in-aid from the federal government.

State expenditure for all higher education in Arizona in 1966-67 represents about 1.5 percent of personal income. Although comparable figures are not available, this would be somewhat higher than eastern states where private institutions predominate (it should be pointed out however that even in these states the bulk of endowment funds are from private donors and hence must be considered as expenditures from personal income), but in all probability it is average or somewhat below average for the western states.

TABLE 44

PERSONAL INCOME AND STATE GOVERNMENT EXPENDITURES IN ARIZONA AND IN ALL FIFTY STATES BY SELECTED YEARS

	ARIZONA (Millions)			ALL FIFTY STATES (Billions)		
Year	Personal Income1)	State Government Expenditure2)	Ratio (%)	Personal Income1)	State Government Expenditure2)	Ratio (%)
1950	$ 979	$ 76	7.7%	$225.5	$15.1	6.7%
1955	1,633	131	8.0	306.6	20.4	6.6
1960	2,669	262	9.8	399.0	31.6	7.9
1965	3,7163)	439	11.8	527.93)	45.5	8.6

Sources: 1) U.S. Department of Commerce, as quoted in the *Statistical Abstract of the United States.*

2) U.S. Department of Commerce, Bureau of the Census, *Summary of State Government Finances.*

3) U.S. Department of Commerce, News Release, April 25, 1966.

TABLE 45

EXPENDITURES FOR HIGHER EDUCATION IN ARIZONA FROM THE STATE GENERAL FUND BY INSTITUTION FOR SELECTED YEARS

(In Thousands)

	1950	1955	1960	1965
Arizona State University	$2,507	$3,130	$ 9,581	$17,987
Board of Regents	....	46	1522)	2692)
Junior Colleges	..........1)	200	300	4,619
Northern Ariz. University	1,328	1,180	1,990	5,361
University of Arizona	4,253	4,744	13,566	25,333
Total	$8,088	$9,300	$25,589	$53,569

1) A small amount for Junior Colleges may have been included in the appropriation for the State Superintendent of Public Instruction, and not included in these data.

2) Includes funds for Western Interstate Commission of Higher Education.

Source: Arizona State Auditor, *Annual Reports.*

Arizona's Tax Structure Compared with the National Average

An overall view of state revenue by source is presented in Table 46. The relative importance of taxes and of the other sources in Arizona is compared with the national average. Arizona relies somewhat more heavily on grants-in-aid, largely because it is a western state and gets the large grants for the interstate highway system. Taxes form a relatively smaller percentage of total state revenue in Arizona than is true nationally.

In the lower portion of Table 46 Arizona's tax structure is compared with that of all fifty states combined. Arizona relies relatively heavily on general sales and property taxes and relatively lightly on individual and corporation income taxes. Heavier-than-average taxation of sales is the practice in Arizona probably because of the transient element of the population. Heavier-than-average property taxation is also the practice probably in view of the great disparity in Arizona in the location of the school population and the location of taxable wealth. This disparity is probably greater in Arizona than in any other state except perhaps Alaska.

On the other hand, Arizona's yield from the individual and corporation income taxes is well below that for the nation as a whole. This is true in spite of the fact that some of the states do not levy income taxes at all. In 1965 Arizona's individual income tax rates were raised 30%. This will bring Arizona income tax yield closer to the national average, but it will still be below it.

Recently the federal government has reduced individual and corporation income tax rates. Barring escalation of war, it would be possible to cut these rates still more. Unlike state government expenses, which tend to vary with population and income, federal expenses include several major elements that are fixed in nature. National defense, for example, will necessitate a given budget in order to be adequate. This is true regardless of whether the nation's population and GNP remain at current levels, or become twice as great, or should shrink. Interest on the national debt, foreign aid, and veterans benefits are other elements of federal spending that are largely fixed.

With the continued growth in the national economy, there could be further federal income tax rate cuts. This would enable

TABLE 46

STATE REVENUE BY SOURCE – 1965 ARIZONA AND THE FIFTY STATES COMBINED

	Arizona (Millions)		All 50 States (Billions)	
	Amount	%	Amount	%
Total Taxes	$238	50.8%	$26.1	53.5%
Intergovernmental Revenue	121	25.8	10.3	21.1
Charges and Miscellaneous	51	10.8	4.5	9.2
Liquor Store Revenue	nil	0.0	1.3	2.7
Insurance Trust Revenue	59	12.6	6.6	13.5
Total Revenue	$468	100 %	$48.8	100 %
General Sales Taxes	$ 88	37.0%	$ 6.7	25.7%
Motor Fuel Taxes	39	16.4	4.3	16.5%
Alcoholic Beverage Taxes	5	2.1	0.9	3.4%
Tobacco Products Taxes	4	1.7	1.3	5.0%
Other Selective Sales Taxes	13	5.5	1.8	6.9%
License Taxes	22	9.2	3.2	12.3
Individual Income Taxes	16	6.7	3.7	14.2
Corporation Income Taxes	9	3.8	1.9	7.3
Property Taxes	33	13.9	0.8	3.1
All Other Taxes	9	3.8	1.5	5.7
Total Taxes	$238	100 %	$26.1	100 %

Source: *Compendium of State Government Finances in 1965*, U.S. Department of Commerce, Bureau of the Census, pp. 19-26.

the states to increase their tax rates, if they wish, without increasing the total of all taxes.

An alternative would be for the federal government to maintain its tax rates at the present level and to increase grants-in-aid to the states. This alternative is less attractive because a suitable basis for general grants-in-aid is difficult to establish.

Forecast of Future Needs

As pointed out in Table 43, general fund expenditures for higher education could amount to $107.2 millions in 1970 and $214.4 millions in 1975. These figures result from projecting past growth rates which have brought about a doubling of these expenditures every five years.

Needed appropriations, as estimated by the universities and colleges, however, are less than the above figures at $94.9 millions for 1970 and $150.0 millions for 1975. These lower figures are based on a slower rate of growth in Arizona in the next ten years than has been true since 1950. They may be more realistic.

TABLE 47

ESTIMATED EXPENDITURES FOR HIGHER EDUCATION IN ARIZONA FOR 1970 AND 1975

(In Millions)

Fiscal Years	Projections from Past Growth Rates[1]	Needed Appropriations (Estimated by the Colleges and Universities)[2]
1970	$107.2	$ 94.9*
1974	214.4	132.8**

Sources: [1]From Table 43.
[2]From Table 42.

*For total needs, an estimated $2.1 millions from "other sources"
**For total needs, an estimated $2.6 millions from "other sources" should be added.

From 1950 to 1965 personal income in Arizona increased at an average rate of 57% for five years. (See Table 44 for the basis for computing this rate.) This rate of increase is much slower than the 84% rate of increase in general fund expenditures. It explains why state expenditures have taken an increasingly larger portion of personal income.

Through improved technology and automation the demand for the goods produced by agriculture and manufacturing can be satisfied by a smaller proportion of the labor force. This leaves more of the labor force to produce services. The service of higher education will undoubtedly continue to grow. Here some of the basis for improved technology is developed, which in turn makes it possible for us to have more services, including the service of higher education.

THE CHANGING ROLE OF THE COLLEGE AND UNIVERSITY IN REGARD TO THE COMMUNITY, THE STATE, THE NATION, AND THE WORLD

There is a fundamental difficulty in appraising the role of any college or university at the state or national level, or on a world-wide basis. This difficulty is inherent in the function of the institutions: namely to guide students in becoming aware of the experience of the human race as a basis for thought and action on their part in the future; to find a place where the individual can best use his capacities to serve society; and finally to develop and practice the art of good citizenship.

The Changing Needs

The world today is seemingly becoming smaller as transportation becomes ever more rapid. Thirty days used to be required to travel from Arizona to countries in Africa; now it is a matter of one day. The art of living at the same time is becoming more complicated and technological and social change more rapid. The institutions of higher learning, therefore, must continue to adjust to the changing scene. In engineering, for example, forty years ago the art of engineering was training students to do the standard thing which was very largely routine, for changes were taking place more slowly than they are today. Now the engineer has to be trained in the basic principles of the sciences. He must be well trained in physics, chemistry, and mathematics in order to understand and to take part in the changes which he will increasingly meet after graduation. For example, the training of engineers in the use of vacuum tubes a few years ago was not adequate training for the day of transistors unless that training involved a knowledge of basic physics. The same conditions are found in all of the professions. The lawyer today, involved in the administration of justice, must understand the forces that bring about abnormal behavior. Therefore he has to have some acquaintance with psychiatry and sociology, and the modern law school must find a place for these subjects in the law curriculum. Work in the field of chemistry today rests upon using some of the tools which have come up through modern physics, and hence the student of chemistry today has to acquaint himself with new instruments dealing with nuclear magnetic resonance or the mass spectrograph to name just two which have been added to the armamentarium of the chemist.

It is common belief today among scientists that the next significant break-through in science will come in the field of biology. Indeed the new knowledge is already making its appearance. These breakthroughs are coming through the use of the tools of physics, chemistry, and mathematics to solve the very complex problems of biology which have had to wait for new tools for their solution.

The Local Role

The college and university must make a realistic choice on the extent to which they become involved in "local problems," but in the last analysis "local problems" are pretty much general problems. For example, water is a fundamental problem in the State of Arizona. The universities, through their faculties, have given a lot of attention to cloud seeding in the attempt to increase the amount of precipitation. Solving this problem can involve a basic study of the nature of the surface of a precipitating agent such as silver iodide. It can also involve a study of the effect of impurities present in the precipitating agent, or the effect of radiations from the sun on the precipitating agent when the agent is released in clouds, and finally it can involve a statistical analysis of the results. Deficiency in water supplies, however, are not limited to Arizona alone. In fact, water deficiencies exist on a world-wide basis.

In the use of water from rivers and lakes, many legal problems arise, and university law schools are deeply interested in these problems. Here again, however, the contribution of a law school while dealing with a specific local problem, makes a contribution to understanding the situation in other states as well as the international phases of some water diversion suggestions.

The curriculum of a modern medical school is quite well established. This does not mean that all courses are taught in the same way in all medical schools. It does mean, however, that the subject matter is pretty well agreed upon, and when changes take place they generally take place nationally. The medical student, of course, must receive an education on the basis of which he can practice good modern medicine. The research work of the medical school may well be related to the environment. In Arizona, one would expect in time the valley fever problem and other respiratory diseases to receive a great deal of attention. On the other hand, one would also expect stroke and cancer and the chronic diseases of the heart to receive continued high priority for research. While undoubtedly the graduates of a medical school may for the most part stay within the state where they receive their education, it will be a fact that students will feel free to move and practice medicine according to the dictates of their own experience.

Changing Programs and Methods

The ever increasing number of students enrolling in higher education give the modern college or university problems in adjustment. The increased use of automation and technical advances in general mean fewer jobs for the unskilled. The increase in our per-capita annual income provides the opportunity to an ever increasing number of students for a college and university experience, whereas a few years ago this opportunity was denied to many students living in homes where income was relatively low. Today with the increased subsidization of higher education by state and federal governments, the institution is facing the very difficult problem of adjusting its programs to take care of these increasing numbers. This means that new techniques for teaching must be explored.

Teaching by Television

Just as the discovery of printing brought about a revolution in teaching techniques so the advent of television calls for exploring and experimenting with this new technique. This is a technique which is advancing very rapidly and institutions of higher learning must stay abreast of it. The advent of color television must be reflected in our teaching techniques. Just as students in bygone decades had to learn by reading so the modern student will have the opportunity to learn through the television screen. The use of the new techniques of television means the universities and the colleges are no longer limited to the campus but can look upon the state and even the nation as their classroom. A number of courses have already been given on nationwide hookups in the field of the sciences, physical, biological, and social, as well as the humanities, and these courses have been taught on a high standard which the colleges can examine with care. Courses in chemistry, physics, mathematics, statistics, art, Russian literature, poetry, constitutional law, to mention only some of the courses, are now offered on a national basis and are taught by very competent instructors. Care must be taken in developing television to see to it that the advantages of a close face-to-face relationship between teacher and student is not lost. This means that the art of carrying on discussion sections must be very carefully studied and practiced. Here is a great opportunity for high excellence in teaching.

Continuing education on all levels from teaching elementary reading to teaching the most advanced courses is possible. Television makes it possible to record the voices of the great leaders of our time. Students can hear these voices and see the people. In the future this experience will not be limited to the living generation alone.

The World Role

It is common knowledge today that in great parts of the world people are suffering from malnutrition; from various kinds of diseases which need no longer exist; from housing that is completely inadequate, and learning which is almost absent. We are also seeing increasingly a revolution on the part of the masses who are demanding that they receive some of the benefits of the civilization of which they are a part. Institutions of higher learning have taken increasingly the responsibility for training students to go abroad, of allowing faculty members time from their resident instruction and research to go abroad and help raise the standards of living in these far away places. Agriculturalists, for example, have gone practically all over the world to initiate modern methods of agriculture to increase the food supply. Educators have gone abroad and have helped to institute colleges, secondary schools, elementary schools, and have planned the educational development of many of these countries for the next twenty years. At the same time an increasing number of students from foreign countries are coming to the United States to learn, not only the techniques on which our culture is built but also to learn some of the habits and general attitudes of our people. The Program for International Living, which had no small part of its start in Arizona, is a fine example of what can be accomplished in this way. Here families of a university community volunteer to open their homes, say on a Saturday afternoon, for foreign students, who may be lonely, to come to know the children of the American home, perhaps have a simple meal and spend a Saturday evening with them. An inter-change of cultures on this very friendly and human basis cannot help but have far-reaching results in the relationships between peoples of distant parts of the world.

The National Role

The universities and colleges also become a part of national programs such as the space program and the development of atomic energy to point out two examples. It therefore becomes evident that the modern college and university is involved in exploring the globe on which we live and no small part of the college or university is its aim through its classrooms to bring forth the evidence that man lives in a consistent universe and not a universe of caprice. This means, of course, that it is possible to understand the universe about him, and this gives rise to the hope that by controlling the forces in his environment he can make it possible for mankind to live in a world that is made better as far as human relations are concerned.

The Expanding Research and Service Programs of the Institutions

To fulfill its role in the community, the state, the nation, and the world, research and service programs at institutions of higher education have developed and expanded in the last few decades. The ivory tower is gone, replaced by the brick and mortar of public service bureaus and the concrete foundations of basic and with these problems research and service agencies have been applied research. The concept of service to the community, the state, and the nation has led the faculties of colleges and universities directly to involvement in the problems of business, manufacturing, mining, agriculture, law, medicine, and government, to name a few. To make available the resources to deal organized and staffed with specialists who typically devote part of their time to teaching and part of their time to bureaus of service and research. This arrangement has its own special benefits to the educational programs of the institutions, for the practical problems of the economy and the society are fed directly back to the podium of the lecture hall and the bench of the laboratory. The problems of the state become the teaching material of the institution.

Bureaus have been established at the universities to deal with problems vital to the economy and well being of the public such as water resources, business and economic problems, forestry, educational and transportation problems, air pollution, and rehabilitation of the physically handicapped. Mining, geological, engineering, and agricultural problems are handled by a bureau of mines, engineering experiment stations, and agricultural experiment stations. Wildlife and fishery units, and a poisoning control center, are all involved in problems of the state. Educational television, bureaus of audio-visual services, and museums are available to the citizens of Arizona.

Twenty-seven such special bureaus and divisions of service and research exist at the University of Arizona, and ten at Arizona State University, providing services to the communities and the state.

The value of such growth of service and research to the state is clearly recognized by the federal government which has increasingly made funds available to support the activities of most of these agencies. Based to a great extent upon the outstanding success that the agricultural experiment stations and extension services have experienced, there is presently strong interest being expressed nationwide in the establishment of similar agencies to deal with urban problems, and some federal funds have already been made available as a start.

It should be borne in mind that increasingly the resources of universities are being called upon in this area of public service and research and that part of the costs of such services, though heavily subsidized from outside sources, are borne by the state. Thus even though an institution of higher education providing such services did not increase its enrollment, such services would continue to increase as the state and nation grows.

Enrollment increases therefore are not the only criteria of cost for institutitions of higher education involved in such services.

The university by its very nature must be multi-purposeful. Its influence reaches from the classroom and the individual student to the far corners of the globe and the masses of humanity.

ORGANIZATION IN THE FUTURE

Coordination and Articulation

Arizona is fortunate in having laid a foundation early upon which to build an efficient organization for higher education in this state. It is among the few states which have adopted a single governing board for its universities. Advantages of a single board are obvious. More efficient coordination and better overall planning are possible for the three universities under one agency.

The state is also fortunate in another respect. One member of the Board of Regents of the Universities of Arizona is an *ex-officio* member of the State Board of Directors of Junior Colleges. This type of liaison provides a good path for articulation and coordination between the universities and junior colleges. Articulation and coordination between the two systems of higher education will become increasingly important as their growth continues. It will be important for a number of reasons. Planning is important at all levels of higher education to insure that high school students are directed toward the institution that can best meet their educational and financial needs. It is important also to insure the ability of students to transfer into upper division programs with as little loss of time and units of credit as possible. As degree requirements change at the three universities, and change they will to keep abreast of the changing needs in educational programs, it is essential that lower division requirements be quickly reflected in junior college transfer curricula. Along these same lines junior college transfer curricula should not be completely at the mercy of changing degree requirements at the universities and four-year institutions. There should be some forum for development of programs that will result in the best combinations for both the students and the institutions.

As enrollments grow, closer coordination of admission standards with the junior colleges will be needed. What weight should be given to junior college grades, to junior college recommendations, to test scores, or to high school records? Grading standards between systems and within systems will present problems as the state grows. Certainly, problems of facilities and resources will become matters of more concern as enrollments rise. How much impact, for example, would a change in admission policies at the universities have upon the facilities and resources of the junior colleges? Would junior colleges be able to absorb those students unable to meet higher admission standards at the universities? To what degree are transfer curricula at the junior colleges compatible with certain required lower division courses offered by the universities? If their contents are not similar, to what degree does this affect the performances of junior college transfer students? These and similar problems are all soluble if a program for articulation and coordination flourishes within the state.

In an enlightening section of a publication dealing with a national study of transfer students, the authors recount interviews with transfer students from junior colleges. Several problems of junior college transfer students become evident from these interviews. Many students felt on the basis of their personal experiences in transferring to a four-year institution or a university that considerable improvement in articulation could have resulted if their experience had been fed back to the junior college administration, but few had the opportunity to do so. This was not a failure on the part of the junior college to be interested in junior college transferees, but rather a lack of a systematic effort to assemble such information so that other transfer students could profit from the experience. Many students felt that better coverage of some material would have been more helpful in junior college transfer programs.[4]

Students interviewed also indicated that "much better—and more—information" concerning the institutions into which they were transferring would have been helpful. The errors in choice made by some transfer students because they did not have adequate information about four-year colleges and universities sometimes caused difficulties not easily surmounted.[5]

A passage from this report is worth quoting because of its pertinence to the topic of articulation.

> "Better articulation at all levels is needed to protect the mobility of good students who will transfer for one or several reasons, to preserve institutional freedom to experiment and innovate, and to encourage all students to strive for the highest level of education they feel capable of achieving. Articulation should seek to remove barriers and obstacles to mobility, both real and imagined. Unless the two-and four-year colleges really believe that it is necessary to work together to remove these obstacles, articulation can scarcely be made to work under any type of arrangement, voluntary or otherwise."[6]

NEW INSTITUTIONS

Junior Colleges

It was pointed out earlier that a number of counties are presently in various stages of developing junior colleges. Undoubtedly the next decade will see a number of such new institutions. A conservative prediction would see a minimum of four more established by 1975 in Maricopa, Pima, Pinal and Yavapai Counties bringing the total number to eleven. Certainly projections of the 18-21 year old population who will be attending colleges suggest that there will be ample demand for this many and several more if all Arizona students who desire post-high school education are to receive it.

As growth in junior colleges continues, the question of tuition for junior college attendance will undoubtedly be raised as it has been in other states. There are opposing views concerning this policy. Some hold that since the first two years of the junior college transfer program duplicates the first two of a four-year college or university program it makes sense to charge the same tuition for both programs. The proponents of this view point out that the added earning power of the student (see Table 2, page 28) more than compensates for the tuition charged. They also point out that the reduced cost to the student who can live at home suggests that some tuition would probably be within the means of most students. A further reason given is that a tuition charge at junior colleges insures more motivation and responsibility on the part of the student since he is paying in part for his education rather than having it provided free by the state.

On the other hand, there are those who observe that tuition charges in junior college cut short the possibilities of students from the lowest income brackets achieving a higher level of education. They point also to the benefits derived by the state from a better educated citizenry and claim that the state is repaid in part at least for its sponsorship by a better tax base in the future.

There are merits to both sides of the argument, and it is a question that inevitably rises with increases in state support of junior colleges.

Four-Year Colleges

Enrollment projections suggest that Prescott College, which opens in September of this year, will not be hard pressed to find the enrollments needed to support its operation in the future. Its progress will be watched closely by a number of interested parties some of whom have already expressed interest in establishing private institutions in this state. If the future of Prescott College is as successful as that anticipated, a move toward the establishment of more private four-year colleges could take place.

Within the period of the projections of this report, public four-year colleges may also be established. All indications are that several of such institutions will be needed to handle enrollment increases by the end of the decade. If such institutions are created they should be as close as possible to the major metropolitan areas of Arizona, and they should fall under the governance of the Board of Regents to preserve the present good coordination of higher education in Arizona.

The formation of new four-year colleges in the state will raise in the future the very sensitive issue of whether junior colleges should be converted to four-year public colleges or whether completely new four-year colleges should be established. The experience in other states indicates that in general the conversion of junior colleges to four-year colleges has not been a popular one. The general trend has been toward the establishment of new four-year colleges, leaving the junior colleges intact to perform their special functions. California, for example, in its master plan, has adopted the policy of creating new four-year institutions and leaving the junior colleges intact. It has further refused to create new universities from four-year colleges, building instead entirely new universities, leaving the state colleges intact.

There have been several arguments posed in opposition to converting junior colleges. In their simplified form these are concerned with the functions and staffing of junior colleges. Many of the programs and policies that are peculiar to junior colleges are not always possible to maintain in four-year colleges. Technical-vocational curricula and wide-open admission policy are two of these. Changes in either of them would create a decided loss to a community. The question is then whether as a four-year college these important facets of its nature would be de-emphasized, or if not de-emphasized, whether its overall program as a four-year college would not be weakened.

When the issue arises and arise it will, these considerations and many more will be set forth by those concerned.

Universities

The present institutions are well located, distributed in the northern, central, and southern parts of Arizona, and serving its major metropolitan areas. Each of the existing institutions can be expanded to provide the facilities needed to handle the upper division and graduate enrollments of the next ten years.

As more community colleges develop it will be appropriate to raise admission requirements at the lower division level in the universities to place the primary concentration of lower division enrollments at the community colleges and the upper division and graduate levels at the universities.

An optimum size of a university is often discussed. The truth of the matter is that there is no hard and fast rule for an optimum size. California has set 27,500 students as the limit for each of its universities. California, however, is financially more able to create new universities than many other states. Michigan State University presently enrolls 42,000 students and the University of Michigan 34,000. The University of Minnesota has 37,000 on its Minneapolis campus, the City University of New York 30,000 at the City College campus, New York University enrolls 32,000, Ohio State 40,000, and Pennsylvania State University enrolls 36,000. The University of Wisconsin also enrolls 29,000 on its Madison campus, with 48,000 on all campuses.[7]

Thus some institutions are presently exceeding 40,000, which is beyond the predicted enrollment for any of the three universities in the decade ahead. There are, of course, certain benefits realized from large enrollments. Principal among these is usually lower per capita educational costs. It stands to reason that the operation of two complete campuses is more expensive than the operation of one large one.

There are, too, certain disadvantages to large campuses. Chief among the disadvantages cited is the loss of personal contact between faculty and students. This objection is, however, often distorted. Even on large campuses with large lecture sections, provision is normally made to supplement large classes with small discussion sections and laboratory sections. Language and English composition sections are kept small because instruction in these subjects requires small sections. Thus close student-faculty relations are usually possible in the majority of classes carried by freshmen and sophomores. Large lecture sections usually make up no more than two or three of the six or more sections (including laboratories and discussion sections) carried by freshmen and sophomores.

Long Range Planning

Both the Board of Regents and the State Directors of Junior Colleges are involved in long range planning for higher education in the state. The Board of Regents last year had an extensive study done by its Long Range Planning Committee. Much of the data in this report results from that study. The Maricopa District has published a report which includes projections of enrollments and junior college sites to 1980.[8] Both systems will continue their long range planning efforts, and as a result their coordinated efforts will help develop an effective plan for higher education in this state.

ARIZONA'S MANPOWER REQUIREMENTS AND HIGHER EDUCATION

Projecting manpower requirements is generally a highly speculative activity. There are any number of variables that are difficult if not impossible to anticipate which can seriously affect estimates. Who could have foreseen in the early 40's the present demand for nuclear physicists and nuclear engineers, or the critical need for aerospace engineers? Such changing needs for specialized manpower are a direct result of the technological revolution in which we find ourselves. New requirements will certainly develop within the ten year period of these projections which cannot now be anticipated. The answer to such needs can be provided in lieu of an accurate forecast first by including in the curriculum basic theory and training in problem solving that will permit easier redirection of activity later, and second by responding in the academic programs of the university to changing needs of the economy and society.

There are, however, some broad employment trends which have been apparent in the past. These can with some assurance be superimposed upon the future. The projections of manpower needs in this section will reflect in a broad way some of the more apparent trends of the past.

Any projections of manpower needs must rest upon a number of basic assumptions. More obvious ones would include an absence of national catastrophies such as a major war or a depression and continued growth of the economy of the state. This latter is related to a continued increase of the population with rates of in-migration in the future similar to those of the past. The growth of population in the state will obviously provide an increasing market for goods and services. At the same time it will also be capable of supplying skilled, semiskilled, and unskilled labor for an expanding economy.

Past Employment Trends in Arizona

Arizona's recorded employment has increased about 190 percent since February 1954. During the last decade the greatest increases in the number of employed occurred in finance, insurance, and real estate (181 percent). Services and miscellaneous employment showed the second largest increase (135 percent) with state and local government employment third (124 percent). Increase in manufacturing employment ranked next (123 percent) and was greater than the increases in mining, contract-construction, wholesale and retail trade, transportation and public utilities. Payroll levels have increased along with employment increases in the state. The average weekly earnings of production workers has increased about 40 percent since February 1954. Weekly hours worked remained roughly the same throughout the ten year period. The increases in average weekly earnings are attributable to increases in pay rates or average hourly earnings.

Employment opportunities in the state have increased most in the non-manufacturing or nonindustrial areas. Services, including both private and public sectors, have created the majority of new Arizona jobs over the last ten years.

During the past decade and a half, growth of the Arizona economy has exceeded changes in the national average. Arizona ranked first in the nation in the rate of change in agricultural income, life insurance in force, bank deposits, income, and nonagricultural and manufacturing employment.

Population Trends

Population increases have already been reviewed. It has been shown that the number of persons in the younger age groups should increase substantially. Currently, approximately

36 percent of Arizona's population is below high school age. About 43 percent are in the wage earning group (the 20 to 54 age bracket). During the next ten years the number of males in the wage earning group is estimated to increase about 30 percent. The national average for this group will decline about 3 percent.

The pattern of population growth and employment and sector changes are both relevant in anticipating future changes in Arizona's economy and manpower requirements.

Occupational Changes

In 1963 occupations in Arizona ranked in order of percentages employed was as follows. These are compared with estimated rankings for 1975.

1963	1975
Craftsmen	Craftsmen
Operatives	Clerical
Professional & Technical	Professional & Technical
Services	Services
Clerical	Operatives
Managerial	Managerial
Sales	Sales
Agriculture	Laborers
Laborers	Agriculture

It can be seen that by 1975 clerical employment will probably replace operatives as second ranked. The professional and technical category will maintain its present high position as third ranked and agriculture and laborers will change positions at the bottom of the rankings by 1975.

Of particular significance in the pattern of occupational changes over the next decade are the professional and managerial skills. These are among the highest income groups in the state's economy and require for the most part the greatest training and educational preparation of all occupational groups. The majority of the personnel entering these occupational groups will be trained in the public colleges and universities of Arizona.

If current trends continue in the professional group, the greatest demand will be for elementary, high school, and junior college teachers. Accountants and auditors will be in great demand as will registered nurses. College teachers, engineers, draftsmen, surveyors, pharmacists, physicians, medical technologists and X-ray technicians will also be in considerable demand. Computer programmers, electronics technicians, lawyers, librarians, and personnel workers will be needed in quantity.

These are the occupations in the professional and technical group which will probably be in the greatest demand during the next decade. In addition to these occupations there will also be increases in demand for agricultural scientists, architects, biological scientists, chemists, dentists, foresters, occupational and physical therapists, reporters and editors, social workers and veterinarians.

Thus the entire professional and technical group will increase at a considerable rate and the colleges and universities will be primarily responsible for their preparation.

The managerial group will also experience increases, particularly retail store managers and hotel, motel, and lodging managers. Wholesale trade managers, managers of eating and drinking establishments, retail food store managers and industrial management personnel will increase substantially. Additional management opportunities will develop in banking, construction, transportation and utilities. A large percentage of the management positions in the state will be filled by college and university trained personnel.

Regional and National Manpower Needs

The state labor market is of course not the only consumer of the output of higher education. Both regional and national demand plays an important part in the employment of individuals trained in the colleges and universities of the state. Table 48 gives 1960 employment in the professional and technical and managers categories for Arizona, the Western Region and the nation. It can be seen from this table that what may be a small local demand is sometimes a considerable regional or national demand.

TABLE 48

EMPLOYMENT IN SELECTED OCCUPATIONS IN UNITED STATES WESTERN REGION[a] AND ARIZONA, 1960

APRIL 1960 – U. S. CENSUS

Occupation	United States[b]	Western Region[b]	Arizona
Professional, Technical & Kindred	7,232,400	1,316,100	51,453
Accountants & Auditors	471,300	86,800	2,890
Agricultural Scientists	7,900	1,900	146
Architects	30,300	6,700	288
Biological Scientists	13,900	3,100	119
Chemists	83,400	11,800	303
College or University Teachers	177,700	31,000	1,224
Dentists	83,000	14,600	400
Draftsmen	213,400	35,900	1,255
Electrical & Electronics Technicians	91,500	26,000	974
Elem. & Kindergarten Teachers	1,003,600	166,400	8,857
Engineers			
Chemical	41,000	5,500	47
Civil	155,200	37,700	1,225
Electrical	183,900	43,500	1,510
Industrial	97,500	15,400	407
Mechanical	158,200	30,400	770
Mining	12,100	3,000	226
Foresters & Conservationists	32,100	10,000	472
High School Teachers	518,000	82,000	3,363
Lawyers & Judges	212,400	30,700	1,220
Librarians	83,900	15,000	509
Medical & Dental Technicians	138,200	30,500	835
Physicians & Surgeons	228,900	38,800	1,484
Registered Nurses	582,400	101,700	4,565
Pharmacists	92,200	14,600	689
Reporters & Editors	100,700	16,200	597
Social Workers	96,700	18,100	535
Surveyors	43,600	10,700	673
Veterinarians	14,800	2,600	138

(Continued on Next Page)

TABLE 48 — Continued

Managers			
Banking & Other Finance	225,400	60,200	2,032
Buyers & Dept. Heads, Retail	234,000	41,700	1,758
Construction (Wage & Sal. Only)	142,500	29,700	1,736
Credit Men	46,700	8,100	267
Communications & Utilities	107,400	20,400	1,307
Eating & Drinking Places	280,000	46,600	2,357
Hotels, Motels & Lodging Places	107,500	INA	2,530
Manufacturing	816,500	52,200	3,502
Purchasing Agents	103,400	19,600	596
Retail Food Stores	322,900	43,800	2,173
Other Retail Stores	1,002,900	175,400	8,579
Transportation	157,100	27,300	1,056
Wholesale Trade	334,400	58,000	2,470

[a] Western Region includes Alaska, Washington, Oregon, California, Hawaii, Idaho, Nevada, Arizona, Utah, Montana, Wyoming, Colorado and New Mexico.
[b] Figures rounded to nearest 100.

A recent publication of the Organization for Economic Cooperation and Development suggests that it is the supply of personnel trained in colleges and universities in combination with other factors that determines the rate of economic growth. Educational growth according to this theory should be considered one of the factors determining economic growth. "This approach," the report points out, "leads to the simple conclusion that a *maximum effort* should be made to expand education in the field of science and engineering."[9] Although this report concentrates on scientific manpower, the same could be said of college and university trained personnel in many other fields which have a direct and indirect bearing upon the economy.

A note of caution is sounded in the report calling for modification of the theory in two respects. It is pointed out that the distribution of students in the various specialization areas must not get out of line with demand for the specilization. And second, it is pointed out that a balance must be maintained between those specialists released for employment and those retained in teaching so that in the short run the economy can continue to grow but in the long run greater numbers of personnel trained in institutions of higher education can be available for employment outside of higher education.

The problem can best be met, the report suggests, in the sciences at least, by encouraging greater numbers of undergraduates into graduate work.[10]

Regardless of whether the supply of a well educated pool of manpower affects the demand or whether the demand is a result of other factors, there is little doubt that the economic and social structure of this state, the region, and this nation will be more than capable of absorbing the output of the colleges and universities of Arizona. The question is really not whether we shall turn out too many college graduates but whether we will be able to supply enough in the decades ahead.

CHAPTER VII

STUDENTS AND FACULTY

While more students go to college every year and college becomes nearly as necessary for students as high school has been in the past, sit-ins and demonstrations at Berkeley, picket lines at Yale and manifest student unrest at an increasing number of colleges all over the nation force us to wonder what is going on, what is different, or perhaps what is wrong with American higher education.

Some insight into these questions can be obtained from a recent study[1] of student unrest published this year by Educational Testing Service of Princeton, New Jersey. Special permission was graciously given to reproduce here much of the information from this valuable source.

Questionnaires were sent to 1,000 regionally accredited four-year, degree-granting institutions in the United States eleciting evaluations and comments from faculty, administrators, and student leaders on the nature and scope of organized student protest in 1964-65.

In the author's words, the study was undertaken for the following four reasons.

1. "The current surge of student unrest and active protest must certainly be among the most significant developments in American higher education, perhaps in American society, of the mid-1960's. As a cultural phenomenon, as a social force, it warrants being understood.
2. "For college faculty, administrators, and student leaders, the present scope of student activism is worth knowing about because of its potential for altering

the operation of colleges and universities. If a behemoth such as the University of California at Berkeley can be brought to a near standstill, what are the chances for a lesser institution in the face of an equally determined band of student reformists?

3. "Based on events at a handful of institutions (epitomized by Berkeley), newspaper accounts, photographs and 'exposés' in national magazines, and the like, American college students are acquiring something of an image, a stereotype, in the eyes of many citizens. Stereotypes assume monoliths—that all the component elements are pretty much alike. How valid *is* the current image which has it that the American college student is rebellious and dissatisfied with the status quo (in contrast, for example, to the image of the student in the 1950's as quiescent and conforming)? Stereotypes can do mischief; persons charged with higher education are done a disservice by a public and its representatives holding simplistic views of students. Students themselves suffer when viewed in stereotyped ways by their elders.
4. "A fourth general purpose for the study was to obtain systematically comprehensive information about organized student protest which could serve both as a context for the myriad impressionistic accounts and 'close looks' at a particular college, and also as a source of data and hypotheses for further study of student activism."[2]

Forms used in the survey consisted of 27 statements on issues, which in turn were contained within five categories: instruction, faculty, freedom of expression, student-administration, and off-campus issues. They were sent to all of the regionally accredited, four-year, degree-granting institutions in the United States in 1964. There were returns from 849 of the 1,000 institutions to which the survey form had been sent. The purpose of the survey was to determine the degree to which organized protest had existed on the several campuses—protest here meaning " . . . a group of reasonably like-minded students which sought in some collective manner to make its opposition to some existing situation to the appropriate authorities." The meaning of "protest" for purposes of the survey was further defined as referring to " . . . planned, public expression of disapproval on the part of *groups* of students and . . . what issues have given rise to such active protest."[3]

We are interested here primarily in the replies on the student-administration section. There was only one issue which ranked higher than food service (29%) in incidence of protest, and that was civil rights, local (off campus) . . . protest and/or work (38%). Food service was followed by dormitory, and other living-groups regulations, e.g., women's hours (28%). Dress regulations were a source of protest according to 20% of the responding institutions. Insufficient student participation in establishing campus policies was reported as a source of protest by 19% of the institutions, and student-administration communication; students unable to voice grievances was reported by 15% of the institutions.

In geographical terms, the incidence of protest in the area of student-administration relations and rules regarding personal conduct was greatest in the region of the New England and Middle States (58%), next were the states in the North Central Association (56%), the states in the Western and Northwest Association (53%); and the southern states (46%).

The category of off-campus issues furnished the greatest source of protest of the five categories with 62% from the West, Northwest; 59% for New England, Middle States region; 57% for the North Central region; and 38% for the Southern region.

To continue the observations made by the author of the report:

> "What does it all add up to?
>
> "First, for most of the readers of this report—college faculty and administrators—the greater part of these survey results will not be particularly surprising. The reader can simply look back at what has happened (or has not happened) on his own campus, compare it to what has been written about Berkeley, and know that college students and student bodies across the land are

not of a mold, that generalizations and 'images' are highly misleading.

"For any specific issue, the number of institutions where protests have occurred constitutes a clear minority when viewed against the totality of colleges and universities. The numbers of students participating in organized protests over any issue constituted even smaller minorities of their respective student bodies. In terms of numbers, the organized student left is still extremely small, probably accounting for less than one percent of the total student population. Generalizations about students being 'angry' and 'up in arms,' and the like, as was said, are misleading and seldom useful.

. . . .

"A large number of deans — this was the most frequent kind of voluntary comment offered — indicated that new arrangements had in fact recently been established or tried out on their campuses by which students were being given a larger voice in college affairs. The lesson of Berkeley, it would seem, has been widely learned.

"Some of the respondents commented in terms of 'channeling' or 'draining off student excesses,' 'hostilities,' and the like. However, the new forms for 'recognizing the student' — faculty-administration-student seminars, student representatives on policy committees, and so forth —unless they truly allow for real student participation, may or may not prove to be wise where a critical student intelligence is present. Sophisticated strategies for manipulating the students are likely to be seen for what they are, and the entire situation will be worsened.

. . . .

"The other general area may well be that of reforms in higher education. *In loco parentis* restrictions on the personal behavior of students will continue to come under steady attack (it is not clear that there is any great moral revolution currently in progress). More importantly, all manner of policies and practices which tend to be at odds with the best possible teaching, which prevent a genuine community of students, and which subvert opportunities for activities judged to be personally worthwhile, will increasingly be targets for student agitation.

. . . .

"Much that is good could eventually come from the student reform efforts, as many have said. In the interim, however, whether the encounter between the students and the authority system at a college proves to be devastating, or satisfying to all, may well depend in large measure on the wisdom and the sincerity with which those authorities move to 'recognize the student.'"[4]

The report concludes that: "When the responses from all the colleges were combined to form a national picture, it was observed that (1) issues pertaining to instruction, faculty, and freedom of expression rarely evoked organized student activism, (2) issues bearing on personal freedoms and student participation in the administration of the college somewhat more often generated protest, and (3) civil rights matters locally was the single issue most frequently cited by the deans (38% of them) as leading to student activism."[5]

If, then, such protest is in the minority, what are some of the factors that contribute to campus unrest as expressed by this vociferous minority?

First, there has been a significant change in the number, composition, and aspirations of college students. Second, there is a rising tide of interest in student rights, student academic freedom, student autonomy and student activism, particularly in the political and social arenas. Third, there is a rapidly rising number of graduate students and an increased emphasis on graduate work and research.

Each of these three points will be analyzed, concluding with an examination of what seems to be the fundamental question before American higher education: how shall decisions be made about the future directions of American colleges, and by whom?

The New Generation of Students

Ever since World War II, and certainly even more so during the last five years, colleges have been struggling to adapt themselves to a different kind of student. Six or seven years ago faculty were lamenting over the silent generation of the fifties and their lack of involvement in the burning issues of their time; they called them the "lost generation." Today the problem is how far should students be allowed to go in their involvements with current issues.

Present day students are molded by a vastly different experience than their parents, their teachers, or the silent ones of the "lost generation." They have lived only during prosperity and do not remember World War II. President Hoover, prohibition, depression, President Roosevelt, and even Winston Churchill, who has lived during their time, are only shadows to them — real yet unreal. Their war is in Viet Nam. Their world is characterized by the overpowering threat of the hydrogen bombs, the incessant cold war, technological changes, the drive for civil rights, and the development of so many new nations that even experts on world affairs can no longer recite the names. Their world has shrunk so rapidly that they find it easy to identify closely with the people in India, Israel, Africa, or Japan.

The present student generation has been reared differently. Their parents have been permissive, there are more broken families, and families move increasingly from place to place. The influence of psychologists and psychiatrists, increased freedom of expression in the public schools, and the pervasive intrusion of television have radically altered the experiences of youngsters. With a newly-found freedom, they have observed the adult world as it engages in a sometimes chaotic and frustrating exploration to discover significant and meaningful personal values. Their parents' generation has been involved with atonal music, abstract — and now pop-art, a literature of self-expression which sometimes borders on nihilism and philosophies which, if understandable at all, exalt the individual, his inner beliefs and his acts beyond everything else.

Students do not think much of the legacy which has been left to them, nor do they prize so-called experience or common sense. Mario Savio, the leader of the free speech movement at the University of California at Berkeley, echoed the thoughts of many students when he said that the students distrust everybody over the age of thirty.

Moreover, thanks to major improvements of high schools, present college students are far better prepared academically than any previous generation. They are more sophisticated, more traveled, more idealistic and vastly more interesting than students used to be. They demand more time from faculty and college administrators. It is a demand that can't be met. The postwar population bulge has now hit the colleges, and student population is growing faster than faculty can grow. From a ratio of one teacher to eleven students in 1950 the average has increased to 14 and is certain to go higher. A generation that demands, and for that matter deserves, more individual attention will, in fact, get less.

Some students—so far, a small minority—have decided that reading, discussion and learning are not enough. They want direct experience with the "real" world, with important problems. They travel to Mississippi, picket federal buildings, tutor underprivileged children, join the Peace Corps, and engage vigorously in politics. They want to reform society's various institutions — including its colleges and universities.

Today's students have labored under considerable pressure to do well in school, to get good grades to get into college; and this pressure begins even in the elementary schools. When they finally get to college the pressure continues and the competition mounts. Then they worry about whether they will be admitted to the best graduate and professional schools. More than half of them now in college will go on to graduate work. The pressure to obtain good grades has turned them into young Scrooges: they consider grades to be the basic currency of the college.

These students are the serious generation as well as the restless generation.

Student Rights

The next change confronting the colleges is the growing student drive for self-determination and autonomy.

This is a relatively new concept in the United States. In the past some college faculties and administrators have tended to be patronizing if not autocratic in dealing with students. But things seem to be changing. The American Civil Liberties Union, The National Student Association, The American Association of University Professors, the newly formed Students for a Democratic Society, and such recent college critics as Paul Goodman have all asserted that students like other Americans have certain inalienable rights.

The definitions of these rights vary. The ACLU is particularly concerned with legal due process for students involved in disciplinary hearings on college campuses. The National Student Association shares this interest but along with the American Association of University Professors extends it to rights of students to invite controversial speakers to campuses, rights of free speech to students, and rights for student participation in decisions within the universities.

While all this may seem new in the United States it is certainly not new in other countries. The earliest university in the Western World, the University of Bologna, was organized and controlled by students in the eleventh century. This tradition in modern times extends to such diverse areas as Latin America, India, and Japan. Students not only have a powerful voice in university affairs but also in national politics. Student demonstrations and riots are commonplace in these countries. Student demonstrations in Japan, for example, were sufficiently threatening to force President Eisenhower to cancel a proposed trip.

The more activist American students now know that students in other countries exert powerful influences. Their own experiences with the Free Speech Movement at Berkeley, the Student Non-Violent Coordinating Committee in the South, and the recent Students for a Democratic Society march on Washington to protest the war in Viet Nam demonstrate that American Students, when organized, can be a potent social and political force. Movements of the Berkeley type are happening on many campuses of the nation. We are witnessing a phenomenon which will continue and which may have important significances on both our educational and political processes. Powerful elements of the right, the left, and the center will ultimately be involved.

So far most of the student thunder has come from the left, and much of the adult thunder from the right. Adult conservatives, like members of the John Birch Society, continue, as they have in the past, to attack the way economics, particularly, and social sciences in general, are taught in the colleges. So far they do not seem to realize that the battle has shifted, that their war has escalated beyond the limited boundaries of classical versus Keynesian economics.

The Port Huron statement of the left-wing Students for a Democratic Society, and the existence of chapters of the society on many campuses over the country, point to the new conflict and the new battleground. The Port Huron statement, which has been widely circulated, concludes by asserting: "From its schools and colleges across the nation, a militant left might awaken its allies, and by beginning the processes toward peace, civil rights, and labor struggles, reinsert theory and idealism where too often reigned confusion and political barter; it has shown its actuality in the South, and in the reform movements of the North . . . "

"To turn these possibilities into realities," the statement continues, "will involve national efforts at university reform by an alliance of students and faculty. They must wrest control of the educational process from the administrative bureaucracy. They must make fraternal and functional contact with allies in labor, civil rights, and other liberal forces outside the campus. They must import major public issues into the curriculum—research and teaching on problems of war and peace as an outstanding example. They must make debate and controversy, not dull pedantic cant, the common style for educational life. They must consciously build a base for their assault upon the loci of power."

During the past year, leadership among students at Berkeley and at some other colleges has been taken over by left-wing reformers. The moderates and conservatives have been inactive or ineffective. In a prophetic passage in his book *The Uses of The University*, Clark Kerr described the consequences of extremists' control of the university.

"To make the multi-university work really effectively," he wrote, "the moderates need to be in control of each power center and there needs to be an attitude of tolerance between and among the power centers, with few territorial ambitions. When the extremist gets in control of the students, the faculty, or the trustees with class warfare concepts, then the 'delicate balance of inter-interests' becomes an actual war."

The Problems of the Undergraduate

The third point, the rise of graduate student enrollment is also changing the face of the university.

Up to the end of World War II, universities like Berkeley and Stanford concentrated most of their attention on undergraduate education. These institutions, and others like them, responded magnificently during the last twenty years to the country's desperate need for more college teachers, more highly trained engineers and scientists, and for research important not only to individual faculty members, but also to the health, welfare and military strength of the country.

Research and graduate instruction take a great deal of faculty time. Undergraduates are beginning to demand equal attention. They decry the depersonalization which exists on some campuses; they cringe at the "manpower" approach to education which perceives students as statistics in a national game of producing engineers, or mathematicians, or whatever.

In former years undergraduate students could envelop themselves in an association with their college. The student knew most of his fellow students and he knew his instructors. A sense of community existed and what was important to one was, in a sense, important to all. Going to college was a highly personal experience and the choice of college had lasting effects. The graduate of a college was molded by his experience, and the difference between a Harvard and a Yale graduate was easily perceptible to the trained eye.

By contrast, the undergraduate in a university of 30,000 or 40,000 students can be hopelessly and tragically lost unless provisions are made to discover him. When he enters college at about 18, he is neither quite an adolescent nor quite an adult. He is searching for an identity of his own to find out what kind of person he is, to see how he compares with others, and to establish his own philosophy of life. He wants desperately to be a participant in a community which cares about him. He believes that faculty members should worry at least as much about him as about the research projects they are pursuing with the aid of government money. He resents the rules and regulations of the monolithic university. Yet, he is tortuously looking for help in forming his own moral code.

Undergraduate students are now demanding that they receive a fair share of the university's effort. They insist that the universities reorganize them so that they will no longer feel isolated or alienated from the university community. Many of them thirst for an education which is more personal. Faculty members at colleges all over the country are beginning to show concern for the students' criticisms. Small colleges, large colleges, the universities, and multi-versities are beginning to stir themselves into thought and action. But faculty machinery grinds slowly. Faculties are loath to change established procedures, and many of them cannot.

Meanwhile, the students are impatient. If normal college decision-making processes are too slow and cumbersome, they will resort to quick and direct action as they have at Berkeley and other colleges across the country. Students are determined to improve their educational possibilities now while they are still in college. They feel harried and restless.

Future Directions

So far, we have observed that our colleges and universities face awesome challenges in attempting to educate a heretofore unimaginable number of undergraduate students. At the same time, in response to pressing state and national needs, faculty members spend more and more time on their research and the instruction of their graduate students. While the students are concerned about the quality of their education, they realize that, if properly organized, they can exert pressure and influence not only on educational matters, but in the political arena as well.

This introduces the final question: how shall decisions be made about the future directions of American colleges, and by whom?

The Background of Authority

Heretofore, the balance of authority within universities has been distributed among faculty members, administrators and boards of trustees. Early in the history of our colleges there were no particular problems in decision making because the number of faculty members was so small. The president of the college was generally considered to be first among equals and his authority posed no problem to his colleagues on the faculty.

During the early part of the 19th century, however, colleges became larger, and a few faculty members experienced the greater freedom accorded the faculty in the great German universities of that period. In 1825, at Harvard, for example a large number of the faculty combined to assert that only members of the faculty had the right to membership in the Harvard Corporation, which in that institution is the equivalent to a board of trustees. The faculty lost the argument, but in losing won a delegation of considerable authority over curriculum and teaching practices.

Later in the 19th century, and early in the 20th century, strong college presidents ran their institutions much like the businessmen of the same period were running their enterprises. Some college presidents were autocrats, benevolent or otherwise. Finally, the autocrats overstepped.

The beginning of the end of this phase came with the formation of the American Association of University Professors in 1915. From the beginning the AAUP concentrated its efforts on the protection of the academic freedom of its members and their concomitant rights of tenure.

Savage attacks by faculty members on the power and prerogatives of administrators and trustees also characterized the early part of the 20th century. They expressed the view that colleges and universities were controlled and dominated by the representatives of big business.

Upton Sinclair in his book, *The Goosestep*, analyzed the membership of boards of trustees of some of the more noted colleges in the country. He asserted that trustees were predominantly corporation executives or corporation lawyers. He observed that many of the college trustees were directors of large corporations and that often trustees of the same college were directors of the same corporation. Finally, he argued vehemently that Columbia University was controlled by the J. P. Morgan interests, that the University of Chicago was dominated by the Rockefellers, that Stanford was dominated by the Western Railroad interests, and so on.

Sinclair and Thorstein Veblen, the economist, urged faculty members to take over control of college administration and abolish administrators and trustees. They deplored what they termed big business intervention in the scholarly life.

It did not occur to the early critics of the colleges to think of students as possible participants in decision-making. Faculty members did not consider students as equal participants in the community of scholars, or as sophisticated enough to participate in anything except listening to what the faculty had to teach.

The Current Status

It is a wholly novel and recent phenomenon that critics of the colleges argue that students have the right to participate in college decisions which affect them and to share in decision-making power with the faculty and administration.

In his recent, widely read book, *The Community of Scholars*, Paul Goodman advocates the formation of many new colleges where perhaps 5 to 10 faculty members and 100 students could jointly explore and learn without outside interference from any source. Goodman's criticism is in many respects trenchant and to the point, although his solutions are Utopian, considering the millions of students who must now be educated. His main innovation, and in a sense his main value, is that he dramatically calls attention to the student and the student's part in the learning process.

Goodman has become the Pied Piper of many students. He has also become a gadfly biting at the tough hides of college administrators and the more tender hides of college trustees. Who shall control universities? The answer is not yet clear but many have begun to explore it. As a result, we can be sure that the pressures will continue internally among students, faculty, administrators, and trustees and externally by many factions attempting to gain control of universities to advance their particular social or political persuasions.

One thing is certain. Many of us are going to be disturbed about various crises in colleges and universities during the next decade. The college has become one of society's most valued and essential institutions. As such, it should be examined critically. As such, it will be attacked. We can only hope that students, faculty, administrators, trustees, alumni, and the general public work moderately and constructively to understand the colleges and to help them more successfully thru a period of trauma and travail.

The Institution in Loco Parentis

For many years colleges, universities, and the public have assumed that when a student was admitted to a college or university the institution immediately upon his matriculation stood *in loco parentis.* The majority of the undergraduates are, in the eyes of the law, infants. The student has in a sense entered into a contract with the institution and is therefore expected, among other things,to abide by its standards of conduct. In this sense the role has too often been interpreted in a strictly restrictive sense: *Thou shalt*, and *Thou shalt not.* In the minds of many of the students, no matter what may be their varying degrees of sophistication in understanding relationships and responsibilities within the college or university, there is resentment toward such pronouncements. It implies a continuation of an authoritative domination from which they believe, by physical separation from their homes and the assumption of a new role, they have been freed.

Miss Katherine A. Towle, who was Dean of Students at Berkeley at the time of the riots, says "From the silent generation of the fifties, we have come full circle to the articulate and activist generation of the sixties . . . *In loco parentis* has little place in today's institutions. Students should be given responsibility for governing themselves, with deans acting as advisers only. Personnel programs should reflect the knowledge that the ideological gap between generations is great."[6]

The responsibility of the institution to the student has been quite well established by practice and by law. In addition to a statement of standards and statements of objectives by which the institution is governed and the student should be guided, the institution has responsibility to the student in the areas of food services, appropriate discipline when necessary, with fair hearings, and provision for the care of his health. These are basic and minimal. Added to them on most campuses is the delegation of authority by the president for self-government in certain appropriate areas. Over and above these are financial aids, work opportunities, job placement, health service, counselling and the like.

Student Rights and Responsibilities

In addition to the basic responsibilities which the institution has to the student, above and beyond the academic, are certain rights which students are demanding for themselves. Williamson has listed the rights which students are demanding on various campuses:

1. "The right to invite speakers of their own choice to speak on any subject.
2. "The right to organize to advocate causes of their own choosing.
3. "The right to adopt resolutions advocating a cause.
4. "The right to organize demonstrations and picketing as means of advocating certain positions and assertions about diverse issues.
5. "The right to editorialize on any subject or issue.
6. "The right to help make institutional decisions concerning rules governing students.
7. "The right to be consulted about all policies, not only those affecting students in their out-of-class activities but also those involving broader academic matters."[7]

He cites six methods which are used by students to give form to these rights, identifying the sixth one as the most desirable: "Fortunately, on an increasing number of campuses, the conversations and consultations concerning causes and issues have become regular and continuous rather than emerging only from disruptive episodes."[8]

Part of the role of personnel deans is to assist all students to understand that along with the rights to which they wish to lay claim are certain responsibilities. In other words, it is necessary for them to learn that rights are attended by complementary responsibilities. In individual conferences deans spend many hours in explaining the whys and wherefores behind specific issues which have raised questions in the minds of students. A solution is necessary on each campus, according to its particular needs and facilities, for a further-reaching, more economical handling of the dissemination of information to students.

Communication with Students

Communication within the college community, between students and faculty on the one hand, and students and the administration on the other, seems to be recognized as the *sine qua non* of an effective, productive campus community. According to an article contained in the May issue of *College Management*, President Edward D. Eddy of Chatham College, Pittsburgh, recently said in part, "The student revolution is over. The time of reconstruction has begun . . . The day of the negative beatnik has begun to pass. . . . His place is being taken by the student who, tired of demonstrations, wants now to bridge the gap, to find substance, to overcome weaknesses, and to rejoin the college community. . . . The student is tired of talking and demonstrating. He has come to the almost-radical conclusion that, to obtain change in desired areas, he must use the procedures and processes available rather than to go around or outside them."[9]

Serious situations on campus may still arise and may still cause crises. To avoid these crises it is necessary to open channels of communication. On the University of Arizona campus a Hyde Park Corner just outside the Student Union permits students to gather once a week to discuss whatever issue may be uppermost in their minds. At the University of Colorado 2,800 students gathered in a ballroom for a six-hour gripe session. By the time it ended at 4:00 o'clock in the morning the group was reduced to a few hundred students, with 81 students obtaining numbered cards and in this order speaking for five minutes each. This provision was made by a professor of sociology and a student-government official. The administration also sent its representative.

The University of Hawaii has formed a President's Round Table on which there are students from 14 campus organizations.

The Chancellor of the University of California at Riverside has a weekly office hour, during which any student may come in without an appointment to discuss anything he wishes to.

The University of Minnesota uses many devices to keep channels open in order to prevent crises from occurring. Should such a crisis come into being and a riot be threatened, the university is prepared to keep the channels of communication open so that the threat can be kept under control.

At Ohio University, the President and the Dean of Students hold weekly breakfasts for groups of 25 students, who may be leaders or may be selected at random.

Purdue is taking major steps, according to the article in *College Management*, ". . . to involve students more closely with the faculty and Administration in the operation of the University. More than 100 members of the faculty and Administration were recently named (by the President) to provide greater contact with students in 14 residence halls. In another move, the University Senate . . . voted to accept a reorganized faculty committee structure which will provide for voting representation by students on nine of 16 new faculty committees."[10]

At the University of Wisconsin the president is reported to have made provision for the students to meet with the Board of Regents for the benefit of the latter. Similar meetings are set up at the level of the divisions within the university. For each major discipline a faculty-senate group has been designed to communicate.

Admissions

Simply stated, the admissions policy of a college or university ideally should be designed to accept those students predicted to succeed academically and deny admission to those who are predicted not to succeed. Academic success is measured by achievement of a satisfactory grade level.

Anyone acquainted with higher education knows that prediction of academic success is never certain. Usually the more evidence available the better the prediction. This evidence is usually high school grades and scores on aptitude tests. Such criteria, however, do not take into account motivation or creativity, or certain factors which result in under-achievement or over-achievement. There is as yet no sure way to measure considerations such as these. College and university admissions officers predict as best they can, knowing that some of the students they admit will in fact not succeed, although the "evidence" indicates they should; knowing also that some whom they have denied may have succeeded.

Of course, every institution has limits to its capacity, with the result that sometimes only a certain number of students can be accommodated. Many institutions today receive more applications than they can accept. Because there are limits on classroom and laboratory space, size of faculty, or dormitory facilities most institutions must carefully select their student body.

Public supported institutions, such as state universities, feel a primary reponsibility to residents of the state. One philosophy holds that every high school graduate in a state, regardless of his high school record, should be admitted to one of the state universities. However, it is now an accepted procedure in Arizona that admission of state residents be selective. Since 1959 only those Arizona students graduating from high school in the upper three-fourths of their class have been routinely accepted for enrollment in the regular divisions of the state universities. Most people, even though they believe a university should have a selective admissions policy, believe also that students should receive some post-high school education at public expense. In many states the public junior colleges have filled this role.

Out of State Students

State universities traditionally prefer not to limit their admissions to state residents alone. Part of the education experience at any college or university is the broadening influence provided by the educational environment of the institution. This educational environment includes the programs of the institution, academic, cultural, and social; the quality and quantity of the faculty; and the composition of the student body. Research on educational environment suggests that one of the strongest single educational influences upon students results from the composition of the student body. In order to provide a rich educational experience it is necessary to create a student body representative of differing economic levels, cultural backgrounds and geographical areas. "Every student body should be leavened with students from other sections of the country and from foreign countries. All of us are provincial. The people of New York City are provincial in their own way. The people of the southern states are provincial in their own way. We are creatures of our environment and locale and from the educational point of view the broadening experience of getting beyond the confines of your own locale is recognized as important."[11]

Many institutions, particularly private ones, carefully select their applicants in order to provide a student mix made up of individuals from different states and different countries. They do this because they recognize the educational advantages of such an arrangement.

There are other values realized from out-of-state students. One of these is the economic advantage accruing to the communities in which institutions are located. Out-of-state students and their families spend considerable amounts of money each year while they attend the universities. The economy of the state is favorably aided by such expenditures.

Many out-of-state students attracted to the universities remain here to become taxpayers and leading citizens. They take their places alongside the majority of Arizonans who have migrated from other states. Considering that the majority of Arizonans are from other states and that the economy of the state is dependent to a large part upon such in-migration, the process of in-migration to the universities seems a normal part of the growth of the population.

The issue is often raised that the out-of-state student frequently goes elsewhere after he gets his degree. The same, however, can be said of the Arizona resident who attends the state universities. Large numbers of them find employment all over the country. An extremely important consideration is that the presence of large numbers of graduating seniors within a state regardless of their geographic origin is an attractive situation to established businesses in Arizona and an inducement to those contemplating establishing businesses in the state. A qualified work force is one of the prime needs of the prospective business as well as the continuing business.

Following is an excerpt from a talk by the president of Western Electric Company.

> "From the perspective of a company with nationwide operations, I can tell you that—increasingly—decisions as to whether to establish a new facility in this town or that one, to assign new work here or there, are influenced by the educational attributes of the communities under consideration.
>
> Traditional considerations—labor rates, transportation, taxes, etc.—are no less important than they ever were. Today, however, we're asking some new questions. Are the skill levels represented in the local work force adaptable to the demands of an advanced—and continuously advancing—technology? Do local technical institutes assure an adequate supply of well-trained, well-motivated technicians to support the work of our engineering organizations? Do local engineer-society activities provide a forum for the kind of professional colloquy that stimulates growth? Do the curricula of local colleges meet the educational needs of employees seeking to advance their own capacities? And, finally, is the cultural life of the community one that is likely to engage the interests of our professional people and their families?"[10]

It is assumed that the out-of-state student must pay his own way and thus he is charged a considerably higher fee than a state student. Further, since the number of out-of-state students that can be accommodated is limited, the requirements for the admission of out-of-state applicants are somewhat higher than they are for state residents. (See page 109 of this report for a statement on out-of-state student costs).

In-State Student Policies

Earlier reference was made to admitting all state high school graduates automatically to their state university if they wish admission. Some persons will claim that it is the "birthright" of every student to have his chance to receive further education if he has been graduated from high school. These persons, of course, feel it is totally inappropriate for state universities and four-year colleges to apply any sort of selective admission procedure to state students, even though statistical studies show that students finishing high school with a grade record below a certain level, or scoring below a certain point on aptitude tests, normally could not survive the competition of university classes. Exponents of a "wide-open-door policy" point out that there are "late bloomers" who should not be denied admission to the university, and they further state that a student is better off for having had a few semesters in the university even though he did not survive long enough to graduate; that he has profited from having had the experience of some college training, even though he may not have earned good grades.

Most persons affiliated with state universities would agree with those who say that a student is entitled to further education at public expense following high school graduation, but only *if* the student's previous record has been such that he has earned this opportunity. Further, the type of post-high school education might be of one type for certain students and of another type for others. For certain students a post-high school education need not be in a state university. It might better be in a junior college, possibly in a vocational program which will prepare the student for immediate employment.

Junior colleges commonly offer both standard lower division work in academic curricula and vocational or technical training. The academic courses normally are recognized when a student transfers to a four-year school, but vocational or technical training is not considered applicable toward a baccalaureate degree.

There seems to be little doubt that as the junior college movement grows in the state of Arizona, thus providing post-high school educational opportunities for more and more high school students in their local communities, the state universities will feel that they appropriately can raise their admission requirements without being guilty of depriving large numbers of state high school graduates. For example, the establishment of a junior college in Tucson would reduce the number of Tucson area students ranking in the bottom half of their graduating classes (but still in the upper three-quarters) who are at present being accepted into the University.

It should be emphasized that an institution's reputation so far as its academic standards are concerned results in widespread self-selection on the part of high school graduates. Many students ranking in the lower half of their high school classes simply do not apply for admission to the universities because they do not feel they can meet the academic requirements of the institutions. This principle of self selection operates in an interesting way. There is a strong interrelation between academic risk and educational cost in the process of self-selection. In general, at all three institutions a student with a poor high school record will not risk academic failure at a higher cost. The result of this is that Arizona students who must pay room and board as well as fees are generally in a higher percentile of their high school graduating class than students who live within commuting distance and must only pay fees. For example, over 60 percent of Arizona students living outside the Tucson area were in the top quarter of their high school classes whereas 40 percent of the Tucson students were in the top quarter of their high school classes. Similar balances in local and non-local Arizona students would be evident at the other two universities. It would follow therefore that if educational risk is high, economic risk tends to be kept low by attending an institution within the community.

Some Personal Characteristics of Undergraduates

The age span of the undergraduate normally bridges late adolescence and early adulthood. In order better to understand students it is necessary to appreciate something of the early phase of the period of adolescence out of which they have come.

As the individual leaves childhood, he has abandoned somewhat the egoism of early adolescence. This has taken place as he has developed social contacts. According to some authorities, he and his companions take on identities which are increasingly masculine and feminine, and likewise more adult. If the individual has experienced a conflict in this change from childhood to adolescence he may be withdrawn for a time. He makes definite evaluations of his family situation, thoroughly approving some constituent parts and perhaps more vociferously disapproving of others. According to psychologists the adolescent is a marginal person without a clearly defined social status. He is torn by opposing forces. The parents are also torn, wanting to do what is best for their child and yet fearing to be too solicitous in protecting him. The range of behavior which governs their attitudes and actions is from too severe discipline to excessive solicitude. It is at this point that adolescents feel a self-conscious concern for the image which their parents present. They want to be proud of their parents in their own right, and reject in embarrassment the wish of the parents to be buddies in playing their role as parents. It can not be stressed too strongly that the adolescent wants his parents simply to be good parents of whom he can be proud.

The clearer definition of the background role which he wishes his parents to play occurs with the developing importance in his life of the peer group. To quote from Harsh and Schrickel, "The age group to which he is related provides the primary frame of reference within which the adolescent develops his attitudes. As adolescents drift away from family ties and into experimenting at being men and women, the increasing mutual attraction between them develops. They find a new security in age-membership groups which stand as unions against an adult-made, adverse world."[13]

They are able, then, to establish status and identity in peer groups. To continue with the quotation, "The age-reference group may become so important as to exclude almost completely the influence of adults (including parents) in those things which he holds most important."[14] Hollingworth identified four adjustments peculiar to this period, two of which are of special interest to people in personnel work in colleges and universities: the psychological weaning from the family and the organization of the ego or self. The former can in most cases be achieved with relative facility. The latter is for many college students a process which continues until they themselves are participating members of adult society. While living in the home they begin to wonder if their parents *ever* were young. In college they develop a hostility to anyone who can even remotely be classified as an administrator. They assume that they themselves understand their problems best and therefore have the best, if not the only, solutions to them. Those students in positions of leadership who take their responsibilities seriously rather quickly become objective when they work with their elders and evaluate problems which have to be solved, goals which are worth striving for, and the desirable means by which these goals may be attained. To a large part of the group of followers who are still reacting to situations emotionally, and therefore without an appropriate amount of thought, the *modus vivendi* is a course of procedure which satisfies their peers. That is the acid test. In defense of the adolescent in this aspect of his development it should be stressed that, for the most part, there is no more reasonable and rational person than he when he *chooses* to seek out factual information in a given situation.

FACULTY

Irwin G. Wyllie in a perceptive introduction to *Higher Education in a Maturing Democracy*, tells of a young biochemistry student from Pakistan who chose to come to America for graduate study because of a rather interesting reason. He had attended in Moscow an international scientific meeting where he observed that about sixty percent of the scientific papers presented were given by Americans, eighty percent of whom were in their twenties and early thirties. "The extreme youth of the Americans stunned the other delegations," he said; "time after time a senior scientist from France, Germany, Sweden, or the Soviet Union shared the program with two Amricans who were his juniors by thirty or forty years."

The student from Pakistan was puzzled how this country could produce so many young top-ranking scientists. To solve the riddle he spent some months in this country in search of the solution. He concluded on the basis of his observations, "You have more academic freedom here than anywhere else in the world." By this he meant two things: unlimited academic opportunity and freedom of teaching and inquiry.

There is more to the solution than this. Certainly the provisions we have made in the extensive public education system of this nation foster the discovery of talents and encourage an early development of excellence; but the variety of education as well as the freedom to teach, learn, and inquire are important aspects of the system.

Academic Freedom

It is important to understand that academic freedom is designed not only for the college or university professor but also for the students and the society. It is designed to insure that the processes for the discovery and dissemination of knowledge are effective; it is designed to provide a testing ground for ideas and theories.

What is academic freedom? Some argue that it is the right to teach the truth. But what is "truth"? As Alfred Whitehead has pointed out, knowledge doesn't keep any better than fish. Today's truism becomes tomorrow's absurdity. So if it is not the right to teach the truth, what is it?

Sidney Hook gives the following definition. "Academic freedom is a specific kind of freedom. It is the freedom of professionally qualified persons to inquire, discover, publish and teach the truth *as they see it in the field of their competence*, without any control or authority except the control or authority of the rational methods by which truth is established."[15]

Academic freedom is more than freedom to teach the *warranted* truth; it is freedom to challenge any idea, any doctrine, no matter how hard the concrete has set around it.

The very fact that the "truths" of the past have sometimes turned out to be less than true should make us wary of the "truths" of the present. The earth is neither flat nor the center of the universe, but such was taught universally at one time. The miasmic theory of disease was taught at the great academies of medicine until critical voices raised against it. We must therefore provide a framework wherein today's truths can undergo close and critical examination, a place where the spirit of inquiry and the light of reason can conjoin.

Academic freedom in the classroom and laboratory carries with it responsibility for reflective inquiry, experimentation, and critical discussion as tests for truth. "To add to these tests external and therefore irrelevant criteria is to establish needless obstacles to the growth of human knowledge."[16]

Few would argue with the principle of academic freedom in the classroom or the laboratory, except those perhaps who would have their special dogmas, their special truths, taught without applying to them the acids of rational process.

But criticisms leveled at academic freedom do arise in another arena. Some find it annoying to hear the voice of the teacher in public controversy. They do not always accept the teacher as a private citizen and would deny him the rights that other citizens freely have. Pressures are sometimes brought to bear upon institutions of higher learning to silence or quiet the voice of the teacher as a private citizen.

Dean Carl Wittke of Oberlin College wrote in *Educational Freedom and Democracy* the following.

> ". . . there are many who find it difficult to understand why professors must be as free as any other class of citizens to take part in any public controversy outside the institution. They find it difficult to realize that no repressive measures of any kind can be justified which have for their objective the curtailing of the professor's freedom of action as a citizen. No matter how unpopular they may become because they oppose powerful interests or challenge long established notions or sponsor ideas that seem mistaken to the benefactors of their institutions, professors must be protected in their tenure rights. Their academic career must be determined by their competence in their chosen field, as judged by those of their colleagues who are best qualified to render an expert judgment, and it must not be affected by the popularity or unpopularity of any opinions they may hold or utter. This is sound practice and the only workable basis on which a real college or university administration can proceed."[17]

"That his (the teacher's) views may not coincide with those of a governing board or do violence to the convictions of the great body of graduates, may be unfortunate," wrote the honorable Ogden L. Mills, "but to ask him to remain silent unless his opinions conform to theirs would be to limit his rights as a citizen, to deprive him of part of his liberty and to impose humiliating restrictions unacceptable to independent and high-minded men. Any university attempting to enforce such a censorship would soon cease to attract pre-eminent men who combine independence of mind with sound scholarship, the very men who bring it strength and vitality. It would thus pay a penalty so heavy as to make any temporary embarrassment or irritation occasioned by the words or activities of an individual, however imprudent, seem comparatively trivial."[18]

It follows of course that in the public realm the professor must make clear that he speaks as a citizen and not for his colleagues or his institution. It is also the case that because of his professional standing he must in his public life proceed with the same regard for facts and for reason that he follows in his classroom and laboratory.

Institutional Autonomy

A university belongs to all sides of the argument not to any one in particular. It must be the testing ground for ideas, theories, and policies. It can espouse neither liberalism nor conservatism but must test both points of view without partisan commitments.

In this sense also the colleges and universities must remain free from political pressures. Autonomy of the institution insures a minimum of partisan pressure. No one faction must be allowed control over the financial resources of the colleges and universities. No one group must be allowed to control the programs and policies of higher education. Such autonomy is in the public interest. The public interest is violated if the institution becomes partisan.

Autonomy and academic freedom are part of the larger issue of democracy. "If we do not believe in one it is useless to argue for the other. The only absolute in a democracy, as in a democratic educational system, is the right to inquire and the right to discuss."[19]

FOOTNOTES

CHAPTER I

A HISTORY OF HIGHER EDUCATION IN THE UNITED STATES

1. College age students are considered to be 18 to 21 inclusive. This age bracket will be referred to hereafter as 18-21.

2. Allan M. Cartter and Robert Farrell, "Higher Education in the Last Third of the Century," *The Educational Record, Spring*, 1965, p. 126.

3. Raymond Walters, *Four Decades of U.S. Collegiate Enrollment*. Society for the Advancement of Education Inc., New York, 1960, p. 7.

4. *Ibid.*

5. *Ibid.*

6. C. C. Furnas and Raymond Ewell, "The Role of Research in the Economics of Universities," in *Financing Higher Education, 1960-1970*. McGraw-Hill. New York 1959, p. 79.

7. *Statistical Abstract of the United States, 1965*, p. 141.

8. Lyman Glenny, "State Systems and Plans for Higher Education," in *Emerging Patterns in American Higher Education*. (Logan Wilson, ed.) American Council on Education, Washington, D.C., p. 91.

9. *Ibid.*

10. *Ibid.*

CHAPTER II

HISTORY AND STRUCTURE OF HIGHER EDUCATION IN ARIZONA

1. Programs of the colleges and universities can best be described by listing the major fields taught at each of the three institutions with their subheadings. This does not in itself describe all programs since it is possible for students to specialize in double majors or to specialize in majors and minors in various combinations.

2. *American Institute for Foreign Trade Catalogue 1965-67*, p. 53.

CHAPTER III

GROWTH AND RESOURCES OF HIGHER EDUCATION IN ARIZONA

1. The West includes the Pacific states of Alaska, California, Hawaii, Oregon and Washington as well as the Mountain states of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming.

2. *The Economy of Arizona*, Employment Security Commission of Arizona, p. 6.

FOOTNOTES

3. *Ibid.*, p. 3.

4. James Doi and Keith Scott, *Normative Data on the Utilization of Institutional Space in Colleges and Universities*, AACRAO, 1960, p. 16.

5. *Ibid.*, p. 9.

CHAPTER IV

FINANCING OF HIGHER EDUCATION IN ARIZONA

1. Louis G. Geiger, *Higher Education in a Maturing Democracy*. Lincoln, Nebraska: University of Nebraska Press, 1963, p. 25.

2. *Ibid.*, p. 28.

3. *Ibid.*, p. 29.

4. John D. Millett, *The Academic Community*. New York: McGraw-Hill Book Company, Inc., 1962. p. 52.

CHAPTER V

THE IMPACT OF FEDERAL FUNDS ON HIGHER EDUCATION

1. *Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1964, 1965, and 1966*, National Science Foundation, NSF 65-19, pp. viii, ix.

2. *Ibid.*, p. ix

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CHAPTER VI

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2. *Projections of Educational Statistics to 1974-75*. Washington, D.C., U.S. Dept. of Health, Education, and Welfare, 1965, p. 36.

3. *Higher Education and the Demand for Scientific Manpower in the United States*. Paris: Organization for Economic Co-operation and Development, 1963. p. 42.

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FOOTNOTES

7. *Opening Fall Enrollments in Higher Education, 1965.* Washington, D.C.: National Center for Education Statistics, 1966.

8. *Junior Colleges for Maricopa County.* Tempe, Arizona: Arizona Educational Consultants, 1965.

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7. E. G. Williamson, "Student's Rights Modified by Correlative Responsibilities," in *Order and Freedom on the Campus, The Rights and Responsibilities of Faculty and Students.* Western Interstate Commission on Higher Education, October, 1965.

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